

**ANCIENT CALENDARS
AND CONSTELLATIONS**

ANCIENT CALENDARS AND CONSTELLATIONS

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WITH ILLUSTRATIONS

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PREFACE

THE Papers here collected and reprinted, with some alterations, were not originally written as a series; but they do, in fact, form one, inasmuch as the opinions put forward in each Paper were arrived at, one after the other, simply by following one leading clue.

This clue was furnished by a consideration of statements made by Professor Sayce in an article contributed by him in 1874 to the *Transactions of the Society of Biblical Archaeology*.

At page 150 he thus wrote:—

“The standard astrological work of the Babylonians and Assyrians was one consisting of seventy tablets, drawn up for the Library of Sargon, king of Agane, in the 16th century B.C.”

And again at page 237 :—

“The Accadian Calendar was arranged so as to suit the order of the Zodiacial signs; and Nišan, the first month, answered to the first Zodiacial sign. Now the sun still entered the first point of Aries at the vernal equinox in the time of Hipparkhus, and it would have done so since 2540 B.C. From that epoch backwards to 4698 B.C. Taurus, the second sign of the Accadian Zodiac, and the second month of the Accadian year, would have introduced the spring. The precession of the equinoxes thus enables us to fix the extreme limit of the antiquity of the ancient Babylonian Calendar, and of the origin of the Zodiacial signs in that country.”

Not many years after this sentence had been penned, archæologists, as the result of much evidence, came to the firm conviction that the date of Sargon of Agane was far earlier than had been at first supposed; and it was placed by them, not “in the 16th century B.C.,” but at the high date of 3800 B.C.

It was in endeavouring to account for the choice

by Accadian astronomers of Nisan as first month of the year, and of Aries as first constellation of the Zodiac, at a date when that month and constellation could not have "introduced the spring," that a possible solution of the difficulty presented itself to my mind—namely, the supposition that the Accadian calendar had been originated when the *winter solstice*, not the *spring equinox*, coincided with the sun's entry into the constellation Aries. This coincidence took place, as astronomy teaches us, at the date, in round numbers, of 6000 B.C.

In the first Paper here reprinted this supposition was put forward; and in the course of following, as above stated, the clue afforded by it, the various subjects discussed in successive Papers claimed always more insistently my attention, as by degrees detached pieces of information concerning the calendars of ancient nations came to hand, and fitted themselves, like the pieces of a dissected map, into one simple chronological scheme.

The study of calendars marked by Zodiacal constellations necessitates an acquaintance with the position of those constellations as they were to be observed through the many ages during which they held the important office of presiding over the year and its changing seasons. Such acquaintanceship would have involved very careful and accurate calculations were it not that, by the help of a precessional globe, it was possible by easy mechanical adjustment to *see*, without the trouble of thinking them out, what were the changes produced in the scenery of nightly skies, millennium after millennium, by the slow apparent revolution of the "Poles of heaven" through the constellations—a revolution referred to by English astronomers as "the precession of the equinoxes," and more graphically and epigrammatically by French astronomers as "le mouvement des fixes."

In the second part of this book diagrams have been given, made from a precessional globe, and

in the explanatory notes which accompany the Plates attention has been directed, not only to the chronological 'problems which may be discussed with great advantage, as I believe, by the help of such a globe, but also to various astronomical explanations of ancient myths which occurred to me in the course of studying the position of Zodiacal and extra-Zodiacal constellations at different ages of the world's history.

• I can only read Classic and Oriental myths in translations, and I feel very sure that if any of the astronomic explanations here suggested for ancient legends should prove to be the right ones, scholars versed in the original languages in which these legends were written, if they supplement their linguistic knowledge by astronomic considerations, will be able quickly and with ease to develop the suggested explanations much further than it has been possible for me to do; and explanations of other astronomic myths—astronomic, that is, and not merely solar myths—will doubtless

come to their minds as they follow similar lines of enquiry.

The steps by which travellers arrive at a far-reaching view are often very steep and arduous. I fear that many readers of this book will find the separate Papers in it dull and technical in themselves; but if they be considered only as steep and roughly-cut steps leading up to vantage points of chronological and historical observation, I believe that the ruggedness of the path will soon be forgotten in the absorbing interest of the results to be obtained by following it.

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ANCIENT CALENDARS AND CONSTELLATIONS

PART I

. I

THE ACCADIAN CALENDAR

[Reprinted from the *Proceedings of the Society of Biblical Archaeology*, January 1892]

EPPING and Strassmaier, in their book *Astronomisches aus Babylon*, have lately translated three small documents, originally inscribed on clay tablets in the second century B.C. From these tablets, we learn that the Babylonians of the above date possessed a very advanced knowledge of the science of astronomy. Into the question of the extent of that knowledge we need not here enter further

than to say that it enabled the Babylonian astronomers to draw up almanacs for the ensuing year; almanacs in which the eclipses of the sun and moon, and the times of the new and full moon, were accurately noted, as also the positions of the planets throughout the year. These positions were indicated by the nearness of the planet in question to some star in the vicinity of the ecliptic, and the ecliptic was portioned off into twelve groups, coinciding very closely in position and extent with the twelve divisions of the Zodiac as we now know them.

As to the calendar or mode of reckoning the year, we find that the order and names of the twelve months were as follows: Nisannu (or Nisan), Airu, Simannu, Dûzu, Abu, Ulûlu, Tischritu, Arah-samna, Kislimu, Tebitu, Šabâtu, Adaru.

Of these months Ulûlu and Adaru could be doubled as Ulûlu Sami (the second Elul), and Adaru Arki (the last Adar). The Babylonian years were soli-lunar: that is to say, the year of twelve lunar months, containing three hundred and fifty-four days, was bound to the solar year of three hundred and sixty-five days by

intercalating, as occasion required, a thirteenth month.

Out of every eleven years there were seven with twelve months, and four with thirteen months. The first day of the year being, like some of our church festivals, dependent on the time of the new moon, was “moveable” (*schwankende*). The year, according to the tablets before Epping and Strassmaier, “*began with Nisan, hence in the spring.*”¹

This is a sketch of the Babylonian calendar in the second century B.C., as drawn from the work of the two learned Germans above-named.

Now we find in the British Museum a great number of trade documents which, according to the Catalogue, “cover a period of over two thousand years.” There are “tablets of the time of Rim-sin, Hammurabi, and Samsu-iluna; tablets of the time of the Assyrian supremacy, of the time of the native kings, and of the time

¹ “Was den Anfang des Jahres betrifft, so haben wir schon gezeigt, das die seleucidische Aera, wie sie in unseren drei Tafeln vorliegt, ihre Jahre mit dem Nisan, also im Frühjahr begann.” (Epping and Strassmaier, *Astronomisches aus Babylon*, p. 181).

of the Persian supremacy; tablets of the times of the Seleucidæ, and the Arsacidæ." ¹

These documents are all dated, in such and such a month of such and such a year of some king's reign; the months are the same (at first under their earlier Accadian names²) as those we

¹ See *Guide to the Nimroud Central Saloon*, B.M., 1886. The dates of the rulers mentioned are as follows:—

Rim-sin, about 2,300 B.C. :

Hammurabi, about 2,200 B.C.

Samsu-iluna, about 2,100 B.C.

Assyrian supremacy from about 1275 to 609 B.C.

The latest tablet in the collection is dated, according to the Catalogue, 93 B.C.

² ASSYRIAN. ACCADIAN MONTH NAMES, AND TRANSLATIONS.

1. Ni'sannu, { *Sara* (or *Bar*) *zig-gar* ("the sacrifice of righteousness").
2. Airu, *Khar-sidi* ("the propitious bull").
3. 'Sivanu, or Tsivan, { *Mun-ga* ("of bricks"), and *Kas* ("the twins").
4. Duzu, *Su kul-na* ("seizer of seed").
5. Abu, *Ab ab-gar* ("fire that makes fire").
6. Ululu, *Ki Gingir-na* ("the errand of Istar").
7. Tasritu, *Tul-cu* ("the holy altar").
8. Arahk-samna ("the 8th month"), *Apin-am a* ("the bull-like founder?").
9. Cisilivu, or Cuzallu, *Gan ganna* ("the very cloudy").
10. Dharbitu, *Abba uddu* ("the father of light").
11. Sabahu, *As a-an* ("abundance of rain").
12. Addaru, *Se-ki-sil* ("sowing of seed").
13. Arakh-makru ("the incidental month"), *Se-dir* ("dark [month] of sowing").

find in the almanacs translated by Epping and Strassmaier, and we meet in them, and in other historical inscriptions, with the intercalary months, the second Elul, and the second Adar. It would seem, then, that it was the same calendar, worked in the same way, that held its place through these two thousand years.¹

¹ As evidence of the antiquity of a fixed calendrical method of counting the year, and of a method closely resembling, if not identical with, that used in the latest periods of Babylonian history, the importance and trustworthiness of these documents can scarcely be over-rated. They were inscribed on soft clay (which was afterwards baked either by sun or fire), many of them four thousand years ago. No correction or erasure can have been made in them since that date. A translation of one of these tablets as given at p. 75 in the *Guide to the Nimroud Central Saloon*, is here given as an example of the style of many others.

"No. 3. Tablet and outer case inscribed with a deed of partnership or brotherhood between Šini-Innanna and Iribam-Sin.

"Tablet. Šini-Innanna and Iribam-Sin made brotherhood; they took a judge for the ratification, and went down to the temple of the sun-god, and he answered the people thus in the temple of the sun-god: 'They must give Arda-luštāmar-Šamaš and Antu-lišlimam, the property of Iribam-šin, and Ārdu-ibšinan and Antu-am-anna-lamazi, the property of Šini-Innanna.' He proclaimed [also] in the temple of the sun-god and the moon-god: 'Brother shall be kind to brother; brother shall not be evil towards, shall not injure, brother; and brother shall not harbour any angry thought as to anything about which a brother has disputed.'

"They have invoked the name of Innannaki, Utu, Marduk,

But, further, there are astrological works copied for the library of Assurbanipal from ancient Babylonian originals. The compilation of many of these originals is placed by scholars in the reign of Sargon of Accad,¹ at the remote date of 3,800 B.C.

Lugal-ki-ušuna, and the name of Hammurabi [Kîmta-rapaštu] the king."

Here follow the names of eight witnesses. The translation of the inscription on the outer case is much to the same purpose, and need not here be quoted ; the names of nine witnesses are appended to it. The *Guide* continues, after some other explanations, as follows :

"The whole of the first paragraph (except a few ideographs) is in Semitic Babylonian. The invocation is in Akkadian. The list of 'witnesses,' again, is in Semitic Babylonian, *and the date in Akkadian*. . . . The tablet is dated in the same way as the other documents of this class : 'Month Adar of the year when Hammurabi the king made (images of) Innanna and Nanâ.'

¹ Sargon I. of Accad was of Semitic race. He was established as ruler in the city of Accad, and there reigned over a great non-Semitic race, in ancient cuneiform inscriptions styled the *Accadai* (Accadians). This word, as scholars tell us, carried the meaning of "highlanders," or "mountaineers." From this fact it is inferred they were not indigenous to the low plain surrounding the city of Accad, to which they gave their name. Their language contains few words for the productions of the almost tropical climate of Babylonia, but it shows familiarity with those of higher latitudes. At the time when Sargon, either by peaceful or warlike arts, was established as ruler over the Accadians, they were already a very highly civilized people. They possessed a literature of their own, which embraced a wide variety of subjects. The learning of the Accadians was highly esteemed,

In these ancient astrological works, the same calendar referred to in the trade documents, and in the late Babylonian almanacs, appears to obtain. We find in them the same year of twelve lunar months, reinforced at intervals by a thirteenth intercalated month, and, which is very important, the order of the months is always the same. Nisan (Accadian Barzig-gar), everywhere appears as "the first month," and is distinctly stated to be "the beginning of the year."¹

As early as the year 1874, Professor Sayce pointed out that there was good reason for supposing that the twelve Babylonian months corresponded to the twelve divisions of the Zodiac. At page 161 of his Paper, *The Astronomy and*

and translations into the Semitic language were made of important religious and scientific Accadian works. These works, down to the latest days of Babylonian power, were preserved and venerated, and many copies of them were made and preserved in public libraries in Babylonia and Assyria.

The Accadian after Sargon's date gradually dropped out of general use, and became a "learned" language, holding amongst Babylonians and Assyrians much the same position as Latin and Greek amongst Europeans.

¹ See *Transactions of the Society of Biblical Archaeology*, 1874. Paper entitled, *The Astronomy and Astrology of the Babylonians*, Prof. Sayce, p. 258, W.A.I. iii. 60.

Astrology of the Babylonians, we read: "Now a slight inspection of the calendar will show that the Accadian months derived their names from the signs of the Zodiac."

He then proceeds to discuss and compare the meanings of the Accadian and Semitic month names, and to point out those in which a reference to the Zodiac might most clearly be traced.

That the constellations of the Zodiac were from a remote age recognized by the dwellers in Mesopotamia is scarcely to be doubted. We find on the boundary stones in the British Museum *representations* of several of their figures. The Bull, the Tortoise (in lieu of the Crab), a female figure with wings, the Scorpion, the Archer, and the Goat-fish, are all portrayed, not only on boundary stones, but also on cylinder seals and gems.

Again, in the old astrological works, we find *mention* of the Scorpion "Gir-tab," and of the Goat-fish "Muna-xa," and as planets are said to "approach to," and "linger in," the stars of Gir-tab and of Muna-xa, it may well be supposed that they were the ZodiacaL constellations still represented under the forms of Scorpion and Goat-fish.

Out of the many star-groups mentioned in the old tablets, only a few have as yet been certainly identified with their modern equivalents. As to the identity of others, we may guess. For instance, when it is said "Mercury¹ lingered in the constellation Gula," we may guess that Gula represents Aquarius, which sign in the Epping and Strassmaier tablets figures as "Gu."

From all these sources of information, we gather that the twelve divisions of the ecliptic had been mapped out at the time the astrological works were drawn up, and that some (at least) of these divisions corresponded exactly to those now represented on celestial globes.

The suggestion, therefore, put forward by Professor Sayce and other scholars, that the twelve Accadian months corresponded to the twelve constellations of the Zodiac, and that we may trace a resemblance in some instances between the name of the month in the old Accadian language and the constellation into which the sun at that time of the year entered, is not in itself improbable.

¹ *Infra*, p. 47, note.

The following months are those in which this resemblance is very striking :

1st month, Bar zig-gar ("the sacrifice of righteousness"), Aries.

2nd month, Khar-sidi ("the propitious bull"), Taurus.

3rd month (sometimes called) Kas ("the Twins"), Gemini.

6th month, Ki Gingir-na ("the errand of Istar"), Virgo.

We know from the Epping and Strassmaier tablets as a matter of fact, that the months and the constellations of the Zodiac *did* in the second century, B.C., correspond with each other in order and sequence as above suggested, and if further research should establish the fact that they so corresponded in Sargon's time, then as we find Nisan (Bar zig-gar) throughout all these ages holding the place of "first month," and marking "the beginning of the year," it will necessarily follow that the Accadian, Babylonian, and Assyrian calendars dealt with a *sidereal* and not a *tropical* year.

Ours is a *tropical* year, that is to say, according

to the Julian calendar (afterwards amended by Pope Gregory) it is bound to the *seasons*, and its months maintain a constant relation to the four great divisions of the ecliptic, *i.e.* the solstices and the equinoxes. The winter solstice always falls about the 22nd of December, the spring equinox about the 21st of March, the summer solstice about the 21st of June, and the autumnal equinox about the 23rd of September.

But (as has been suggested) the Accadian year was a *sidereal* year, and its months maintained a constant relation to the twelve *star-marked* divisions of the ecliptic, or, as they are called, the constellations of the Zodiac. Nisan always corresponded (as closely as a lunar month might) to the time during which the sun traversed the constellation Aries; Airu to the time during which it traversed the constellation Taurus; and so on through the twelve months of the year.

The equinoctial points are, however, always, though slowly, changing their position amongst the twelve constellations of the ecliptic. The months, therefore, which in 3,800 B.C., and still in the second century B.C., corresponded to the same star-groups,

as above noted, must have held in different ages very different positions in regard to the four great divisions or *seasons* of the year.

We find in the tablets translated by Epping and Strassmaier the year "*beginning with Nisan, hence in the spring*," and this seems a more or less natural season from which to count the year: but when, taking the precession of the equinoxes into account, we find that the year in Hammurabi's time (2,200 B.C.) must have commenced one month, and in Sargon's time (3,800 B.C.) two months before the spring equinox, we feel surprised and perplexed to find that the year must then have begun without any reference to the seasons—the four great and most easily observed divisions of the ecliptic.

It is difficult to imagine that the astronomers who so skilfully divided the ecliptic into its twelve parts, and who originated the wonderful Accadian calendar—a calendar so well thought out that, as we have seen reason to believe, it resisted all the shocks of time for nearly four thousand years—it is difficult to imagine that such astronomers should have taken no note of the four prominent divi-

PLATE I

FIG. 1.

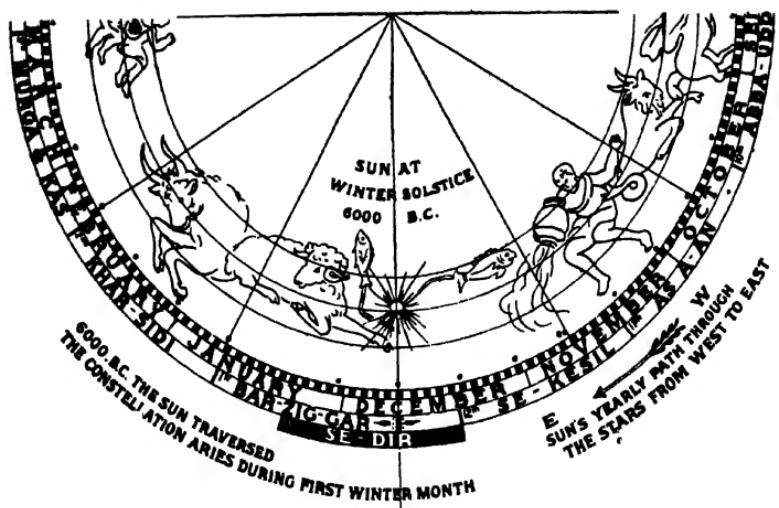
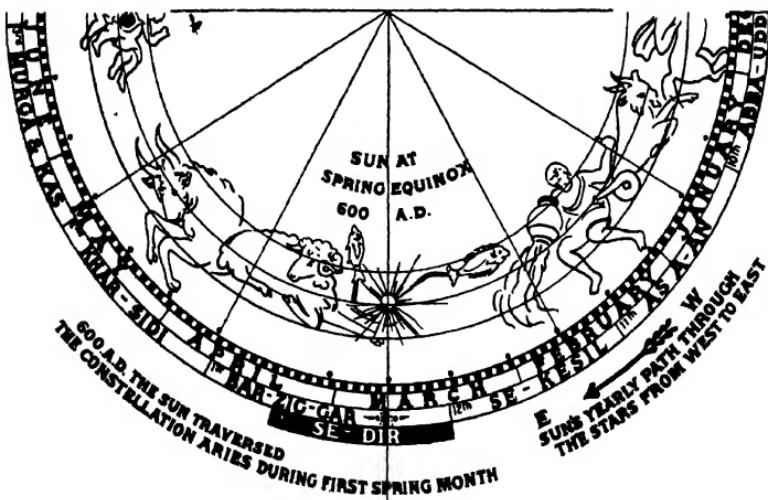


FIG. 2.



The first and last months of the Accadian, sidereal, year, compared with the months of the Gregorian, tropical, year : at 6,000 B.C. and at 600 A.D.

[To face p. 13.]

sions of the year and of the ecliptic, *i.e.* the solstices and the equinoxes.

There is, however, a way to account for this anomaly, or, rather, there is a supposition which, if adopted, will allow these astronomers of old to have taken note, not only of the *months*, but also of the *seasons* of the year, when first they drew up their mighty scheme.

Let us suppose that the calendar which, as we may learn from the astrological tablets, was already in Sargon's time a well known and venerated institution, had been originally drawn up at a date much earlier than Sargon's, when the first month (Bar zig-gar), was not the first *spring* month, but when it was the first *winter* month of the year. This date (see Plate I., fig. 1) would have been about 6,000 B.C. ; for then the sun entered the constellation Aries at the *winter solstice*—a season equally well, if not better suited than the spring equinox to hold the first place in the calendar.¹ Under this

¹ After this paper had appeared in the *Proceedings of the Society of Biblical Archaeology*, a corroboration of this opinion occurred to the writer's mind, suggested by a further study of the month names in the Accadian calendar. It is as follows:—

The twelfth month is named "sowing of seed." Seed may be

supposition, it would no longer be difficult to imagine why the ancient Accadian astronomers should have chosen Aries as the first constellation of the Zodiac, and Nisan (Bar zig-gar) as the first month, and the "beginning of the year."

Nor need we throw discredit on the early

and is, sown in many latitudes in *spring*, and also in *winter* time. "Sowing of seed" might therefore describe a month at the ending of an equinoctial or of a solstitial year: but the thirteenth (*i.e.* the occasionally intercalated) month is named that of "dark sowing." This epithet *dark*, added to the "sowing" of the twelfth month, very plainly points to a solstitial or midwinter ending of the year.

The thirteenth month in a luni-solar year, whose beginning should be bound to the vernal equinox, must always cover some of the concluding days of March and some of the first days of April; and those days are certainly much *lighter, not darker* than those of the preceding month, covering parts of February and March, whereas, the thirteenth intercalary month in a luni-solar year, whose beginning should be bound to the winter solstice, must always cover the concluding days of December and those at the beginning of January; and might well be distinguished by the epithet *dark*, not only from the days of the preceding month, but indeed from those of any other month of the year (see Plate I., figs. 1, 2.)

It is of interest here to note that this insistence in Accadian month nomenclature on the darkness of the thirteenth month, tends to confirm the already formed opinion of scholars, that the Accadians were not indigenous to Babylonia, but had descended into it from more northern latitudes, where darkness is a more marked concomitant of winter than in the nearly tropical latitude of Babylonia.

calendar makers 6,000 B.C., if we take for granted that they were not acquainted with the fact that slowly but inevitably the seasons must change their position amongst the stars, and that, not knowing this, they believed that in making the *beginning of the year* dependent on the sun's entry into the *constellation Aries*, they were also binding it to the *season of the winter solstice*.

As centuries rolled by, however, and slowly the stars of Aries receded from the winter solstice, Bar zig-gar was no longer the first month in the sense of being the first winter month. Still, the authority of the originators of the calendar held sway; provision had been only made for counting the year as a sidereal year; and Bar zig-gar, or the month in which the sun entered Aries, was still called the first month, and looked on as the beginning of the year.

To carry out the reformation of any long established calendar is, we know, not a trifling undertaking. Even on secular grounds, any proposed reform encounters strong opposition. But the calendar in Babylonia was not only a civil, it was also a religious, institution. Its origin was attributed

to the Creator, and as the work of the Creator, it is described in one of the old Babylonian tablets.¹

“For each of the twelve months He fixed three stars” (or groups of stars). “From the day when the year issues forth to the close.”²

The astronomical and astrological texts drawn up for Sargon of Accad are entitled “The Illumination of Bel,”³ and still as late as the second century B.C., all Babylonian almanacs bore the heading: “At the command of my Lord Bel and my Lady Beltis, a decree.”⁴ Thus it was, we may suppose, that under the protection of the gods the Accadian calendar continued unchanged throughout all the changing ages.

¹ *Records of the Past*. New series. Vol. i. p. 145.

² In modern works we find the terms “useless,” “fanciful,” and “inconvenient,” applied to the Zodiac and its constellations; and for regulating a tropical year the constellations are “useless” and “inconvenient,” but the theory that the reckoning of the year and all its religious festivals depended on the observance of the Zodiacal star-groups, would help to account for the widely spread veneration in which they were held throughout so many ages and by so many nations.

³ *Transactions of the Society of Biblical Archaeology*, 1874, pp. 150, 151.

⁴ Epping and Strassmaier, *Astronomisches aus Babylon*, p. 161. (*Auf Geheiss von Bel und Beltis meiner Herrin, eine Entscheidung.*)

But during all the ages the winter solstice moved on steadily through almost a quarter of the great circle of the ecliptic,¹ and in the second century B.C., the *spring equinox* was not far from the same point of the star-marked ecliptic where

¹ This moving of the equinoctial point through a *quarter* of the great circle may perhaps explain the tradition to which Syncellus twice alludes, once when he states that Eusebius was aware of the Greek opinion that many ages, or rather myriads of years had passed since the creation of the world, *during the mythical retrograde movement of the Zodiac, from the beginning of Aries, and its return again to the same point* (*Chronographia*, p. 17.)

And again at p. 52, he refers to "the return of the Zodiac to its original position, according to the stories of the Greeks and Egyptians, that is to say, the revolution from one point back again to the same point, which is the first minute of the first division of the equinoctial sign of the Zodiac, which is called *κρίς* (Aries) by them, as has been stated in the *Genica* of Hermes and in the Cyrannid books."

He goes on to say that this is the ground of the chronological division of Claudius Ptolemy.

Jean Silvain Bailly, speaking of the Indian Zodiac, the beginning of which is placed by the Brahmins at the first point of Aries, suggests that a similar tradition may have prevailed amongst the Indians and other ancient nations to account for the pre-eminence so generally accorded to Aries. He says :

"Mais pourquoi ont-ils choisi cette constellation pour la première? Il est évident que c'est une affaire de préjugé et de superstition ; le choix du premier point dans un cercle est arbitraire. Ils auront été décidés par quelque ancienne tradition, telle par exemple que celle que Muradi rapporte d'après Albumassar et deux anciens livres égyptiens, où on lisoit que le monde avoit été

the *winter solstice* had been when first the calendar-makers had “fixed” the constellations “for the twelve months from the day when the year issues forth to the close,” and we who now read the almanacs drawn up at that late period of Babylonian history are not (as has been said above) surprised to find the year “*beginning with Nisan, hence in the spring.*” (See Plate I., fig. 2.)

The propositions contained in this Paper are these :—

I. The Accadian year was counted as a sidereal year.

II. The Accadian calendar was first thought out and originated at a date not later than 6,000 B.C.

The first proposition is founded on the opinion,

renouvellé après le déluge lorsque le soleil étoit au 1° du bétier, régulus étant dans le colure des solstices. D'Herbelot ne parle point de régulus; mais il dit que selon Albumassar les sept planètes étoient en conjonction au premier point du bétier lors de la création du monde. Cette tradition, sans doute fabuleuse, qui venoit des mêmes préjugés que celle de Béroze, étoit asiatique. Elle a pu suffire, ou telle autre du même genre, pour fonder la préférence que les brames, ou les anciens en général, ont donnée à la constellation du bétier, en l'établissant la première de leur zodiaque. Ils ont cru que ce point du zodiaque étoit une source de renouvellement, et ils ont dit que le zodiaque et l'année se renouvelloient au même point où le monde s'étoit régénéré.” (Bailly, *Histoire de l'Astronomie Ancienne*, pp. 482, 483.)

long ago expressed by many Oriental scholars, that the Accadian months corresponded in very early ages with the constellations of the Zodiac, Nisan—the month during which the sun was in conjunction with the constellation Aries—holding the first place then, as also in the latest times of Babylonian history, and, presumably, through the intervening period.

But even if the first proposition is granted, the second, it must be confessed, is only an opinion based on the unlikeness that the old Accadian and sidereal year, otherwise so skilfully dealt with in the calendar, should have begun, in what would appear to be a haphazard manner, at no definite season of the year.

It may seem that too much weight has been attached in this Paper to what can only be called a guess; but where there is so much that we desire to know, and so little as yet absolutely known of the early history of astronomy, the temptation to make such guesses is great.

It is to their earliest heroes and to their gods that the ancient heathen nations attributed the invention of astronomy, and amongst the Jews

also, according to Josephus, the children of Seth were looked upon as being the first teachers of the science.¹

Modern astronomers often speak in general terms of their science as having existed in a "hoar antiquity," and in "prehistoric times." But questions as to when, and where it took its rise, are still unanswered. During the last hundred years these questions have been keenly discussed. Babylon, Egypt, Greece, India, and China, have each been claimed as "the cradle" of the science. Some few writers (and prominent amongst them Jean Silvain Bailly, a brilliant scholar and an eminent astronomer) have contended for the view that not by any one nation were the chief advances in astronomy made, but that before the great races of mankind separated from the parent stock, and spread themselves over the globe, the phenomena of astronomy had been closely observed, and scientific methods for measuring time had been adopted. Bailly speaks of "une astronomie perfectionnée," of which only "les débris" are to be met with in possession of the civilized races of

¹ *Antiquitates Judaicae*, I. 2, § 3.

antiquity. He claims an antediluvian race as the originators of astronomic science.

It may seem a bold suggestion to place the formation of the calendar at a date so high as 6,000 B.C., a date exceeding as it does by 2,000 years that given to us in the margin of our Bibles for the story of the fall of man and his expulsion from Eden. It was in following Archbishop Usher's calculations that the date of 4,004 was adopted and placed, where it still remains, in our English Bibles. But the difficulty of determining the early dates of Bible history has always been felt to be very great, and "it is quite possible to believe that Genesis gives us no certain data for pronouncing on the time of man's existence on the earth."¹ Scholars, in basing their calculations on the authority of Scripture, have arrived at very different conclusions. Some only demand 3,616, others 6,984 years, as required from Scriptural sources for "the years of the world to the birth of Christ."²

¹ Introduction to the Pentateuch, by E. Harold Browne, D.D., Bishop of Ely. Holy Bible, with Commentary, edited by F. C. Cook, M.A., Canon of Exeter.

² The following extracts are taken from the Preface to *An Universal History from the Earliest Account of Time to the Present*:

It will be seen that the earlier of these dates leads us back to an even more remote age than that in which, if the theory here proposed is a true one, the marvellous achievement of the formation of a scientific sidereal calendar was accomplished.

To attribute to the dwellers in Eden or to their immediate descendants intellectual gifts that should enable them to perfect so grand a scheme, does certainly not contradict the story of the fall, but

Compiled from Original Authors [Etc.]. Dublin: Printed by Edward Bate for the Editors: M,DCC,XLIV.

They are interesting as showing that even before archæological research had extended the limits of ancient history, as it has done during the last fifty years, many biblical scholars assigned a far higher date than Archbishop Usher's 4,004 years for the history of Adam's race on earth.

P. lxv. *et seq.*: "So that on a strict view and due examination of the antiquities of nations, and the records that have been left us, those of the Jews, exclusive of their divine authority, will evidently appear to be the most certain and authentick. . . . However it must be confessed that there is no certain uniformity in the Jewish computation, and that the several copies of their records, *viz.*, the Hebrew, Samaritan Pentateuch, and Septuagint differ very much from one another. . . . This variety of computations hath left room for Chronologers to enlarge or contract the space of time betwixt the flood and the birth of Christ, by adhering to one copy rather than another; or by rejecting or retaining the whole numbers, or the particulars, just as it suited their humour of making the Sacred History agree with the Prophane; or otherwise of reducing the Prophane to the Sacred, and as the disagreement among the heathen writers is great also, and every author hath followed the historian he liked best, hence a wide difference

rather may open up for us fresh lines of thought, when we read of that transgression in which the pride of intellect played so important a part.

hath arisen amongst modern Chronologers as appears by the various computations . . . which we here give as collected by Strauchius, Chevreau, and others. It would be endless as well as unnecessary here to examine into the particular causes of this great difference amongst authors, every one still pretending to ground his system on the authority of the Scripture.

A Table of the years of the world to the birth of Christ, according to the computations of several chronologers.

Alphonsus, King of Castile, in Muller's Tables	6,984
The same, in Strauchius	6,484 9 months
Onuphrius Panvinius	6,310
Suidas	6,000
Lactantius, Philastrius	5,801
Nicephorus	5,700
Clemens Alexandrinus	5,624
The author of the Fasti Siculi	5,608 9 months
Isaac Vossius, and the Greeks	5,598
Etc. etc."	"

II

THE CONSTELLATION ARIES

[Reprinted from the *Proceedings of the Society of Biblical Archaeology*, March 1893]

In the January number of the *Proceedings of the Society of Biblical Archaeology* for last year, under the title *The Accadian Calendar*, two propositions were advanced:—

I. The Accadian year was counted as a sidereal year.

II. The Accadian calendar was first thought out and originated at a date not later than 6,000 B.C.

The fact that the sun's entry into the constellation Aries appears to have marked through many millenniums the beginning of the Accadian year, was cited in support of the first proposition, and the fact that the sun's entry into Aries coincided about 6,000 B.C. with the winter solstice, was relied on to support the probability of the

second proposition, namely, that at the above date the calendar, which so honoured the inconspicuous constellation Aries, was first drawn up.

If we now find this inconspicuous part of the heavens equally honoured by several nations in very ancient times, we shall be led to think either that these nations, independently of each other, happened to observe and mark out the sun's annual course through the heavens at exactly the same date, and therefore chose the same point as marking the winter solstice; or we must suppose that they derived their calendar and knowledge of the Zodiac from observations originally made by some *one* civilized race.

The Brahmins of India claim a high antiquity for the science of astronomy in their country, and their observations and calculations profess to date back to the fourth millennium B.C. The names of the Indian constellations are preserved to us in the Sanscrit language, and these names are, so to speak, identical with those that we use at the present day when we speak of the figures of the Zodiac. Many scholars of to-day believe that only after Alexander's conquests in India did the know-

ledge of the twelve-fold division of the Zodiac penetrate into that country. Some, on the other hand, maintain the opposite opinion, namely, "that the names of the signs can be proved to have existed in India at as early a period as in any other country."¹

Jean Silvain Bailly, whose opinions as to the antiquity of the science of astronomy have been already quoted in the foregoing Paper, in his work on the history of ancient astronomy, speaking of the Brahmins of India, the initial point of whose Zodiac is at the first star in the constellation Aries, writes as follows :²—

¹ V. p. 90.

² The initial point of the Hindu Zodiac (see Plate III.) is about $9\frac{1}{2}$ degrees to the west of the boundary line of the constellation Aries, as it is drawn on our celestial globes. One foot of Aries, however, extends beyond the boundary line, and touches a line drawn through the initial point of the Hindu Zodiac and the poles of the ecliptic. At page 132, the question of the date of the fixation of this initial point is discussed, and a high antiquity for it is claimed. There are many considerations which may lead us to the opinion that not only in India, but amongst the ancients generally, the first degree of the constellation coincided with the Hindu initial point, and not with the boundary line of the constellation, as it is now drawn. Greek and Latin authors, writing in the first century B.C., speak of the solstitial and equinoctial colures, as being "at the eighth degree of the Zodiac," and these

“ Mais pourquoi ont-ils choisi cette constellation pour la première? Il est évident que c'est une affaire de préjugé et de superstition; le choix du premier point dans un cercle est arbitraire. Ils auront été décidés par quelque ancienne tradition.”

Dupuis, writing at nearly the same date as Bailly, about a hundred years ago, and in conflict with him on many points relating to the Zodiac, was also struck by the choice of this same inconspicuous point in the great circle of the ecliptic, not only by the Brahmins of India, but also by other ancient nations. He further explains that the difference in the choice of initial point by the Chinese, and by the other nations, is only an apparent, and not a real difference. On the wonderful agreement shown by so many nations, in their choice of the stars by which they marked the beginning of their Zodiacs, Dupuis relied to

statements, which have caused modern commentators much perplexity (see *Handbuch der Klassischen Alterthumswissenschaft; Zeitrechnung der Griechen und Römer*, Unger), may be easily explained, if we realize that they, in all likelihood, counted the degrees of the Zodiac from the same initial point as that in use amongst Hindu astronomers, which in the first century B.C. was eight degrees to the west of the equinoctial point.

support his views concerning the unity of the astronomical and religious myths of all nations.

At the end of his work, *Mémoire Explicatif du Zodiaque*, Dupuis gives in a diagram several Zodiacs in concentric circles; some divided into twelve, some into twenty-seven or twenty-eight parts. He represents the colures by a cross which quarters these concentric Zodiacs, and speaking of the twenty-seven- and twenty-eight-fold divisions, he observes as follows:

“On remarque d’abord, que ces divers systèmes lunaires, tirés de l’Astronomie de différens peuples, s’accordent tous à placer dans les cases correspondantes à-peu-près les mêmes étoiles. Il suffit, pour s’en assurer, de comparer les étoiles designées dans la même case de la division de chaque peuple. On remarque aussi qu’ils ont pris tous, excepté les Chinois, les mêmes étoiles, pour point initial de la division, savoir, celles de la tête du Bélier. Les Chinois, au contraire, ont fixé le point initial dans la partie du ciel diamétralement opposée, vers les pieds de la Vierge et pres l’Epi” (p. 4).

Dupuis’ arguments, drawn from the choice by several nations of the first division of Aries as the initial point of the Zodiac and year, are of

equal cogency in support of a calendar such as he suggests, drawn up more than 12,000 B.C., for a year beginning at the *autumn equinox*; or for a calendar, as suggested in this Paper, drawn up about 6,000 B.C., and dealing with a year beginning at the *winter solstice*; and it may be claimed that the facts brought to light by the study of the ancient Accadian calendar, while greatly strengthening the ground for Dupuis' opinion concerning the early acceptance by many nations of the stars of Aries as a mark for the beginning of the year in prehistoric times, seem more in favour of the first month of that year having been counted from the *winter solstice* than from the *autumn equinox*.

Quotations from authors like Bailly and Dupuis may seem nowadays somewhat out of date; for though they were amongst the foremost scholars of their time, they were necessarily ignorant of all the archæological discoveries that have succeeded each other with such rapidity during the last century. Unless, therefore, the brilliant guesses and astronomical speculations of these writers can find confirmation in the results of modern researches, their theories may well be disregarded.

But it seems to me that many of their theories are meeting with such confirmation.

Turning first to some of the facts which archæology has taught us regarding the ancient Egyptians, it will be interesting to see if there are any indications in their astronomy or mythology of honour paid to the constellation Aries in connexion with the progress of the sun and moon through the figures of the Zodiac.

It is true that the acquaintance of the ancient Egyptians with these figures is a matter still in dispute, and the various methods of counting the year followed by them also present great difficulties to scholars. It is, however, admitted that they were a people much given to the observation and worship of the heavenly bodies, and that their astronomy and mythology were very closely interwoven with each other.

In the time of the Middle Empire, it seems, the months in the civil year were not counted as lunar months, but as months of thirty days each. The year was not counted as a sidereal year, but as one of three hundred and sixty days—twelve months of thirty days—with five days

added at the end of each year to bring up the number to three hundred and sixty-five days. No attention was paid to the odd hours and minutes over and above the three hundred and sixty-five days, which are occupied by the sun in completing his annual course.

Mr Griffiths has remarked in the number of the *Proceedings of the Society of Biblical Archaeology* for March 1892, that the hieroglyph for month points to an *originally* lunar month, and I would suggest that the star under the first crescent seems to point also to a month originally counted sidereally, *i.e.*, dependent upon the conjunction of the sun and moon in some particular star-group of the ecliptic. As a matter of fact, the Egyptians made use not only of a civil year such as has been above described, but also of a sidereal year, counted from the heliacal rising of Sirius, and it is perhaps possible that the months in this sidereal year were counted as lunar months, and the year treated as soli-lunar and sidereal.

In these two Egyptian *calendars*—so far as they are at present understood—no reference to the constellation Aries seems to be discernible.

The agricultural importance of the season of the summer solstice in Egypt, coinciding as it does with the rising of the Nile, may have induced calendar-makers at some very early date to re-arrange the order of the year, so as to make it begin at the *summer* rather than the *winter* solstice—the season, as it is contended in these Papers, originally chosen 6,000 B.C. by astronomers in a more northern latitude than that of Egypt as the starting-point of a year sidereally marked by the conjunction of the sun with the constellation Aries.

But if we turn to the Egyptian *mythology*, the importance of the Ram, or rather of the head of the Ram, as it is revealed in the monuments, and in the pictorial art of the ancient Egyptians, must continually strike the student of Egyptian symbolism.

Amen, the great god of the Theban triad (Amen, Maut, and Chons), is sometimes represented as ram-headed—his boat and his sceptre are always adorned with a ram's head, and the great temple to him, in conjunction with the sun, *i.e.* to Amen-Ra, is approached through an avenue of gigantic ram-headed sphinxes, and this is also the case as regards the temple of Chons—the

moon-god—at right angles, and in close proximity, to the great temple of Amen-Ra.

Scholars tell us that Horus, Isis, and Osiris, —the Memphian triad—symbolized the *diurnal* motion of the sun and other heavenly bodies, and it need not appear improbable that the great Theban triad, Amen, Maut, and Chons, should have originally symbolized the *annual* course of those same bodies through the constellations of the Zodiac. This would account for the prominence of the Ram in connexion with the worship of this triad—the Ram, which, as I have argued, in many countries, and possibly in Egypt also, marked the first division of the Zodiac and year.

A prayer to Amen is translated by G. Maspero in the April number for 1891 of the *Proceedings of the Society of Biblical Archaeology*;¹ from this translation it would appear that Amen is implored to bring the calendar into touch with the real seasons of the year. If Amen represented a

¹ “Il ne me reste plus qu'à donner la traduction suivie du texte (Papyrus Anastasi, iv., p. 10. L 1-5), dont je viens d'expliquer le sens et le développement littéraire.

“Viens à moi, Amon, me délivrer de l'année fâcheuse, où le dieu Shou (Shou était, à l'époque des Ramessides et plus tard, le dieu du soleil solsticial, du soleil d'été, comme Brugsch l'a

sidereally marked point in the yearly course of the sun, such a prayer might suitably have been addressed to him by the Egyptians.

The great temple to Amen-Ra at Thebes, approached, as has been stated above, through an avenue of ram-headed sphinxes, is oriented to the setting sun of the season so important to Egyptians, that of the summer solstice, and this fact strengthens the opinion that Amen was considered to be a god in some way presiding over the course of the year and its right measurement. It is true that this orientation of his temple precluded the possibility of the light from any star of the constellation Aries ever shining into the shrine of the god; but it is perhaps possible that the ceremony of "the great montré fort ingénieusement) ne se lève plus, où vient l'hiver où était l'été, où les mois s'en vont hors leur place, où les heures se brouillent, où les grands t'appellent, ô Amon, où les petits te cherchent, où ceux même qui sont encore dans les bras de leur nourrice, ceux-là (crient): 'Donne les souffles! — Amon trouve Amon écoute, Amon est le sain devant qui marchent les souffles agréables; il me donne d'être comme l'aile du vautour, comme la palette chargée des discours des Esprits pour les bergers dans les champs, pour les laveurs sur la berge, pour les garde-chasse qui sortent au territoire des gazelles afin de lacer (le gibier)."

M. Maspero states that the latter lines of the text are injured and difficult to decipher or to understand.

feast-day of Amon Father," described by Ebers, may have been devised by the votaries of Amen as a means whereby they could honour the god, as one presiding over the most propitious season of the year, and also recall the sidereal connexion of the god of the year with the, from times immemorial highly reverenced, constellation Aries.

At pp. 277 and 278 of *Egypt, Descriptive, Historical, and Picturesque*, vol. ii., Ebers, having referred to some figures represented on the walls of a Memnonium in the Nekropolis erected by Rameses II., exactly opposite to the Great Temple of Karnak, observes :—

"Of these figures the inscription says :—'As they approach the king their arms are filled with choice produce and stores, and all the good things that the earth brings forth are gathered by them to add to the joy on the great feast-day of Amon, the father.'"

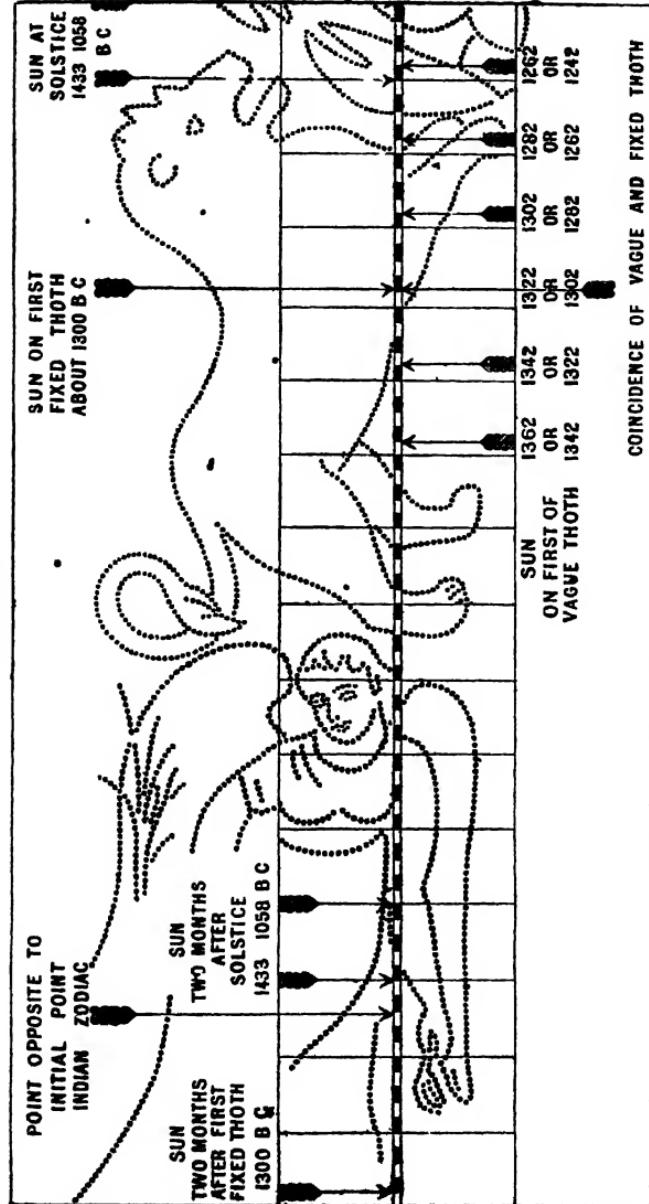
"These words refer to the great 'feast of the Valley' (*heb en-ant*), when, on the 29th day of the second month of the inundation, the statue of Amon was brought forth from the sanctuary with much magnificence and solemnity, and conveyed across the Nile to the Nekropolis, that the god might there

offer sacrifices to his ancestors in the other world. The priests of the house of Seti received the procession with the splendid bark Sam, the most sacred of all the vessels that were preserved in the temple of Karnak : in this the statue of the god was placed, and borne first to the Memnonium of Seti, and then round about the Nekropolis, preceded by a crowd of temple servants, who strewed the way with sand. The solemnities ended with a grand nocturnal spectacle, on the great sacred lake of which traces may still be seen to the extreme south of the Nekropolis.

“The Egyptian religion prescribed to all its followers that they should visit the tombs of their dead and bring offerings, in grateful remembrance of their parents and forefathers ; and as, day after day, millions of suns had gone to rest—as men do—behind the realm of tombs in the Libyan hills, the god himself was brought to do honour to his departed ancestry, and to sacrifice to them.”

The rising of the Nile in Egypt coincides very closely with the season of the *summer solstice*. At the date of Rameses II.—a date not yet unanimously agreed on by scholars, but which may be safely placed between 1,400 and 1,100 B.C.—the sun at the season of the *summer solstice* was in the constellation Cancer (see Plate II.), and

PLATE II.



Relating to "the Feast-day of Anon, the Father."

Position of sun on first of fixed Thoth varied by about one degree in two hundred years.

[To face p. 36.

two months later its place in the ecliptic was a few degrees to the west of a point exactly opposed to the first stars of Aries and to the initial point of the Indian Zodiac. On the evening, therefore, of the 29th day of the second month of the inundation, when the sun had now sunk behind the Libyan hills, and daylight had faded sufficiently to allow them to show their light,¹ the first stars of Aries rose above the eastern horizon, and at midnight attained to the southern meridian.

Thus at the season of all the year, when Aries specially dominated the ecliptic, the statue of the god Amen was, as we learn, brought out of his dark temple shrine and carried in procession to the Nekropolis, from whence the constellation Aries—not hidden by obstructing walls and columns—was fully visible; and there honour was done and sacrifice offered to “Amon Father.”

But it may be said that we should understand “the second month of the inundation”

¹ When the sun is about 7° below the western horizon, stars in the opposite quarter of the heavens begin to be visible.

to refer to the second month of the Egyptian sidereal year counted from the 1st Thoth (fixed) and marked by the heliacal rising of Sirius. At the date of Rameses the beginning of this sidereal year fell, as may be proved, a fortnight after the *summer solstice* (see Plate II.), and still on the 29th of the second month of this sidereal year the stars of Aries might be seen rising in the east—no longer only its first stars, but nearly the whole constellation then becoming visible—and at about midnight, its brightest stars, α and β Arietis, culminated on the meridian. Whether, therefore, the “Feast of the Valley” was held at the end of the second month of the actual inundation, or of the second month of the sidereal year, the stars of Aries presided over its “nocturnal” solemnities.

Some scholars claim, however, that all Egyptian festivals were swept round through the seasons, and the stars that marked those seasons, in the course of fourteen or fifteen hundred years, inasmuch as they were firmly bound to the *vague* calendrical year of 365 days. If this was indeed

so, it would be difficult to imagine that Seti I. or Rameses II. could have established the festival in question as in any way connected with honour to be paid to the constellation Aries; for though during the reign of Seti, and perhaps during the early part of that of Rameses, the vague and fixed years coincided more or less closely (see Plate II.), yet before the death of Rameses they were already so far apart that the 1st Thoth (vague) fell, not a fortnight later than the summer solstice, but about a fortnight earlier; and therefore on the 29th day of the second month of the vague year the stars of Aries would not have risen until long after sunset, nor would any one of them have culminated on the meridian at midnight.

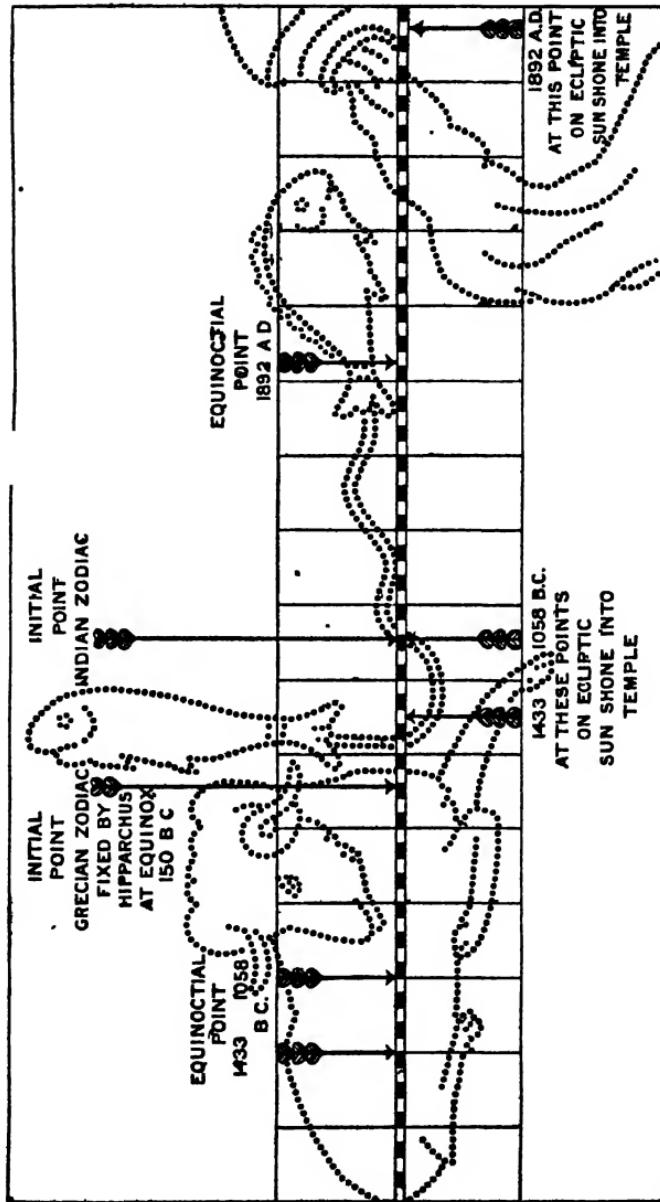
If now we turn our attention to the temple to Amen-Ra at Aboo Simbel, we may observe that, unlike that to the same god at Karnak, it is not oriented to any definite *season* of the year. The rising sun shines into it now, and must always have shone into the Holy of Holies of that rock-hewn temple on the morning of a day somewhat more than two months distant

from the winter solstice, and somewhat less than a month before the season of the spring equinox, namely, on the morning of the 26th February (Gregorian).¹

The sun now (1893 A.D.) is, at the season named, in the constellation Aquarius ; but if we calculate back to a date anywhere between 1,400 and 1,100 B.C., we shall find (see Plate III.) that when Rameses II. dedicated this temple to

¹ "I was fortunate in seeing another wonderful thing during my visit to Aboo Simbel. The great temple is dedicated to Amen-Ra, the sun-god, and on two days in the year the sun is said to rise at such a point that it sends a beam of light through both halls till it falls on the shrine itself in the very Holy of Holies. Many theories are based on the orientation of the temples, and Captain Johnston wished to find on which day in the spring of the year the phenomenon took place ; so he took his instruments, and we all went up to the temple before dawn. It was the 26th February. The great hall, with its eight Osiride pillars, was wrapped in semi-darkness. Still darker were the inner hall and shrine. Behind the altar sat the four gods, Amen, Horus, Ptah, and Rameses himself, now deified. All the East was a deep rosy flush ; then that paled, and a hard white light filled the sky. Clearer and whiter it grew, till, with a sudden joyous rush, the sun swung up over the low ridge of hill, and in an instant, like an arrow from the bow of Phœbus Apollo, one level shaft of light pierced the great hall and fell in living glory straight upon the shrine itself."—A. F. [Extract from the *Pall Mall Gazette*, 20th April, 1892.]

PLATE III.



Relating to the Orientation of a Temple to Ammon-Ra.

[To face p. 40.

Amen-Ra, the sun when it penetrated into the shrine of the temple at Aboo Simbel was in conjunction with the first stars of the constellation *Aries*, and this fact must, it would seem, encourage us to adopt the opinion put forward above concerning the desire of Rameses II. to honour that constellation in connexion with the god Amen.

It would seem then that there are indications in the mythology and in the history of the Egyptians, of honour paid to the constellation Aries, and as we further study the records of antiquity, now within our reach, it will, I believe, become evident that not only the Egyptians, but also all the great civilized nations of the East, had traditions of a year beginning when the sun and moon entered the constellation Aries—such a year as that in use amongst the Babylonians during their long existence as a nation, and such as that which is used by the Hindus in India to this present day.

If we allow weight to these considerations, it will be difficult to think that such a method of reckoning the year—involving, as it did, the recog-

nition of the ecliptic star-groups under the fanciful figures of the Zodiac—should have been arrived at by each of these nations independently. Whether one nation borrowed these ideas from another, or whether some “earlier race of men” bequeathed this knowledge to their many descendants, is still an open question. Scholars have not unanimously awarded the palm of seniority in civilization to any one nation, and we are not at variance with proved facts, if we elect to adopt the theory of a common stock, from which the divergent races sprang. If, then, it should appear that these races possessed and incorporated into their mythologies a knowledge of the Zodiac, and of the first degree of Aries as its initial point, their separation from the parent stock must have been subsequent to the formation of the scheme that dealt with a calendar based on an observation of the colure of the winter solstice at that point, and under this supposition the date of 6,000 B.C. becomes a foothold for the chronology of ancient history. We should also be led to think of the common ancestors of the civilized races not as ignorant barbarians, but rather as men graced with high intellectual gifts—men whose teachings have

been handed down through all the ages to this present day, and of whose imaginings the Zodiac remains as the most ancient monument of the work of intelligent man.

III

(GU), ELEVENTH CONSTELLATION OF THE ZODIAC

[Reprinted from the *Proceedings of the Society of Biblical Archaeology*, February 1896]

IN the astronomical tablets (of the 1st and 2nd cent. B.C.) translated by Epping and Strassmaier, the twelve constellations of the Babylonian Zodiac are constantly referred to. Their names appear under very abbreviated forms in the tablets, and are as follows:¹—

1.  (ku(sarikku)) = aries.
2.  (te(mennu)) = taurus.
3.  (mašu) = gemini.
4.  (pulukku) = cancer.
5.  (arū) = leo.
6.  (serū) = virgo.
7.  (zibantu) = libra.
8.  (agrabu) = scorpio.
9.  (pa) = arcitenens.
10.  (enzu) = caper.
11.  (gu) = amphora [aquarius].
12.  (sib) = pisces.

¹ *Zeitschrift für Assyriologie*, v Band, 4 Heft, Oct. 1890, p. 351.

Also in Epping and Strassmaier's work, *Astronomisches aus Babylon*, under the heading *Die Zeichen des Thierkreises*, pp. 170, 171, and *Namen der Sterne*, pp. 174, 175, the twelve abbreviations met with in the tablets are discussed at some length.

From a study of the list here given and of the passages referred to, we learn that it has been found possible to suggest for some of the abbreviations suitable terminations, and in the completed words thus obtained, the familiar constellations of the Zodiac, as we know them, are easily to be recognized.

As regards other of the abbreviations, and amongst them that of  (Gu) for the eleventh sign (Amphora or Aquarius), no termination has been suggested; and of it Strassmaier thus writes:¹ p. 171:—"Gu ist sonst fast ausschliesslich nur als Silbenzeichen gu bekannt"; and Jensen, discussing Epping and Strassmaier's constellation list, writes thus of the abbreviation Gu for the eleventh constellation:² "Ob Gu einen 'Was-

¹ *Astronomisches aus Babylon*.

² *Kosmologie der Babylonier*, p. 314.

sereimer,' 'Schöpfeimer,' bezeichnen kann, weiss ich nicht. Die bisher veröffentlichten Texte geben keinen Aufschluss darüber."

As a probable completion for the abbreviation Gu, the following suggestion is here put forward:—

In the ancient astrological tablets translated by Professor Sayce in his Paper, *The Astronomy and Astrology of the Babylonians*,¹ pp. 189, 190, "the star of Gula" is mentioned. The first syllable of this word is composed of the same cuneiform group as that used in the abbreviation for the eleventh constellation of the Zodiac in the astronomical tablets of the first and second centuries B.C. above referred to. But this fact, if it stood alone, would not be enough to do more than point to a possible identification of Gu in the late tablets with Gula in the ancient astrological works. Amongst the many constellations in the heavens the name of more than one might have begun with the syllable Gu.

We find, however, at a later page (206) of Professor Sayce's Paper, this sentence translated from W.A.I., III. 57, 1:—

¹ *Transactions, Biblical Archaeology*, vol. iii., February 1874.

"Jupiter¹ in the star of Gula lingers." None of the five planets known to the Babylonians could ever with truth have been described as appearing or "lingering" in any part of the heavens outside the band of the Zodiac stars. "The star (or constellation) of Gula," we must therefore assume, was a ZodiacaL star or constellation. This restriction of the position of the "star of Gula" renders it scarcely a rash conclusion to arrive at, that the *ZodiacaL* Gu of the later tablets is an abbreviation for the *ZodiacaL* Gula of the ancient astrological works.

As to a mythological reason for the choice of the goddess Gula to preside over the constellation known to us as Aquarius, we find it in the fact that Gula appears as another name for the goddess Bau² and Bau (or Bahu) was a personification of *the dark water*, or chaos.

If we adopt this identification of the star or constellation Gula with the constellation, or some star in the constellation, Aquarius, it will throw light

¹ Or, rather, "Mercury." See Epping and Strassmaier, *Astronomisches aus Babylon*, p. 112 *et seq.*

² Maspero, *Dawn of Civilization*, p. 672, notes 1, 2.

on many of the inscriptions found on statues and other monuments at Telloh (the modern name of the mound which covers the ruins of the ancient city of Lagash).

We find from these inscriptions that the deities especially worshipped at Lagash were not the same as those who held the foremost places contemporaneously in the Accadian, and at a later time in the Babylonian Pantheon. Ningirsu and "his beloved consort," the goddess Bau, received in Lagash the highest honours. On one of the statues of Gudea, "the priestly governor of Lagash," this inscription occurs:—

"To Ningirsu, the powerful warrior of Ellilla [this is dedicated] by Gudea, priestly governor of Lagash, who has constructed the temple of Eninnu, consecrated to Ningirsu.

"For Ningirsu, his lord, he has built the temple of Ekhud, the tower in stages, from the summit of which Ningirsu grants him a happy lot.

"Besides the offerings which Gudea made of his free will to Ningirsu and to the goddess Bau, daughter of Anna, his beloved consort, he has made others to his god Ningiszida.

¹ Evertts, *New Light on the Bible*, p. 162.

“ That year he had a block of rare stone brought from the country of Magan ; he had it carved into a statue of himself.

“ On the day of the beginning of the year, the day of the festival of Bau, on which offerings were made : one calf, one fat sheep, three lambs, six full grown sheep, two rams, seven *pat* of dates, seven *sab* of cream, seven palm buds.

“ Such were the offerings made to the goddess Bau in the ancient temple on that day.”

Ningirsu, the god—so highly exalted in this and in other inscriptions found in the mounds of Telloh—has been identified with the god Ninib¹ of the Babylonians. Much difference of opinion prevails as to what astronomical ideas were connected by the ancient inhabitants of Mesopotamia with the god Ninib.

Jensen admits that the generally received opinion as to Ninib is that he represents the “southern sun.”² He, however, contends, with great eagerness, that this is a mistaken opinion, and that Ninib is really the eastern or rising sun. Many of Jensen’s arguments against the possibility of Ninib

¹ Maspero, *Dawn of Civilization*, pp. 637, 645.

² Jensen, *Die Kosmologie der Babylonier*, p. 460.

representing the southern sun are based on the assumption that the epithet "southern," applied to the sun, denotes the power of the mid-day sun; whereas, in other descriptions of Ninib, he appears as struggling with, though in the end triumphant over, storm, and cloud, and darkness.

The sun in his *daily* course attains the southern meridian at noon, and that may well be described by Jensen as the "alles verzehrenden und versengenden Süd-oder Mittagssonne," but if we think of the sun in his *annual* course, the words "southern sun" may more fitly in an astronomical sense mean the struggling and finally triumphant sun of the winter solstice. And if we so understand the expression, the apparently contradictory references to Ninib are easily explained.

At mid-winter the sun rises and sets more to the south than at any other time of the year; at noon on the day of the winter solstice the sun is forty-seven degrees nearer to the south pole of the heavens than it is at the summer solstice.

If, instead of adopting Jensen's contention, and looking upon Ninib as the eastern rising sun, we revert to the generally held opinion that Ninib was

the god of the southern sun, and if we understand the southern sun in its astronomical sense as the winter, or more strictly speaking the mid-winter sun, it will naturally lead us to the conclusion that "the day of the beginning of the year," the day of the festival of Bau, Ningirsu's (= Ninib's) "beloved consort," was held at the time of the winter solstice.

Speaking in round numbers, from 4,000 to 2,000 B.C., the winter solstice took place when the sun was in conjunction with the constellation Aquarius, which constellation, or some one of its stars, was, as has been suggested, called by the Babylonian astronomers, Gula, Gula being another name for Bau.

It is not therefore surprising to find that those rulers of Lagash, whose dates fell between 4,000 and 2,000 B.C., should have so often associated together Ningirsu and Bau; and further, that Gudea, whose rule is placed at about 2,900 B.C., should on "the day of the beginning of the year" have kept high festival in honour of Bau, as the beneficent deity presiding in conjunction with Ningirsu over the revolving years.

The precession of the equinoxes must neces-

sarily in the course of ages introduce confusion into all ZodiacaL calendars, and into all ritual and mythological symbolism founded on such calendars. From 2,000 B.C. down to the beginning of our era, the winter solstice took place when the sun was in conjunction with Capricornus, not with Aquarius. In those later days, if the inhabitants of Lagash still celebrated their new year's festival at the winter solstice, Bau (=Gula=Aquarius) could only have laid a traditional claim to preside over it.

In accordance with these astronomical facts, we learn from the teachings of the tablets that the especial reverence paid to Bau=Gula, in the Lagash inscriptions was not extended to her in later times.

As to Ninib, we know that even at Gudea's date in the neighbouring state of Accad, and in later times in Babylon, he did not hold the pre-eminent position accorded to him by the early rulers of Lagash.

This difference in the religious observances of Accad and Lagash regarding Ninib—if we suppose him to be the god of the winter solstice—may also receive an astronomical explanation.

According to the evidence of *The Standard Astrological Work*, the compilation of which is generally attributed to the date 3,800 B.C., and according to the evidence of many other tablets, the year in Accad and afterwards in Babylon began not at the winter solstice, but on the 1st day of Nisan, and Nisan (Acc. Bar zig-gar), the month of "the sacrifice of righteousness," was, as its name suggests, the month during which the sun was in conjunction with the constellation Aries.

At Gudea's date, about 2,900 B.C., the 1st of Nisan, if it was dependent on the sun's entry into Aries, must have fallen about midway between the winter solstice and the spring equinox, and as century succeeded century, the 1st of Nisan must slowly but surely have receded further from the solstice and have approached more and more to the equinoctial point.

In Accad, therefore, neither at Gudea's nor at any later date, did the year begin at the winter solstice, and hence we can understand why in that state, and afterwards in Babylon, Ninib was not as highly honoured as in Lagash, and why he and his consort Bau (=Gula) were not referred to as

the deities presiding over the beginning of the year.

In a former number of these *Proceedings*¹ I drew attention to the Accadian calendar. It was there suggested that the choice of the first degree of Aries as the initial point of the Zodiac was originally made when the sun's entry into that constellation, *i.e.* about 6,000 B.C.

If that suggestion, and the present one concerning the new year's festival in Lagash are accepted, it will be easy to imagine that the Lagash observance betokened a sort of effort to reform the sidereal calendar in use in Accad, and it may be elsewhere.

In Accad the calendar makers clung to the originally instituted *star-mark* for the year, and made it begin with the sun's entry into Aries; therefore by degrees the beginning of their year moved away from the winter solstice, and in the first century B.C. coincided very closely with the spring equinox.

In Lagash, on the contrary, the calendar makers

¹ January 1892, V. p. 13.

clung to the originally established *season* of the year, and made it begin at the winter solstice; therefore by degrees the beginning of their year moved away from the constellation Aries, and in Gudea's time the new year's festival was held in honour of the goddess Bau=Gula=Aquarius.

IV

THE MEDIAN CALENDAR AND THE CONSTELLATION TAURUS

[Reprinted from the *Proceedings of the Society of Biblical
Archæology*, June 1897]

IN a former number¹ of these *Proceedings* I contrasted as follows, what I believed to be the calendar of the Accadians with that of the inhabitants of Lagash :—

“ In Accad the calendar makers clung to the originally instituted *star-mark* for the year, and made it begin with the sun’s entry into [the constellation] Aries ; therefore by degrees the beginning of their year moved away from the winter solstice, and in the first century B.C. coincided very closely with the spring equinox.

“ In Lagash, on the contrary, the calendar makers clung to the originally established *season*

¹ V. p. 54.

of the year, and made it begin at the winter solstice; therefore by degrees the beginning of their year moved away from the constellation Aries, and in Gudea's time [about 2,900 B.C.] the new year's festival was held in honour of the goddess Bau=Gula=Aquarius."

I now desire to draw attention to the Median calendar, which appears to have differed from that used, as above suggested, in Accad or in Lagash; inasmuch as the beginning of the Median year was not dependent on the sun's entry into the *constellation Aries*, as in Accad; nor was it fixed to the season of the *winter solstice* as in Lagash.

The beginning of the Median year was fixed to the *season of the spring equinox*, and remaining true to that season, followed no star-mark. The great importance, however, of Tauric symbolism in Median art seems to point to the fact that *when the equinoctial year was first established* the spring equinoctial point was in the constellation Taurus. Astronomy teaches us that was the case, speaking in round numbers, from 4,000 to 2,000 B.C.

It is true that we have no documentary proof of the existence of a Median *equinoctial* calendar in the remote past, such as that which we possess in the Babylonian standard astrological works regarding the ancient *sidereal* Accadian calendar. We have, however, among the modern representatives of the Medes, the Persians, a very distinctive calendrical observance, namely, that of the Nowroose, or the festival of 'the new year'; and we have the Persian tradition that the institution of this festival was of fabulous antiquity. I quote from Ker Porter's remarks on this subject:—

"The 21st of March, the impatiently anticipated day of the most joyous festival of Persia, at last arrived. It is called the feast of the Nowroose, or that of the commencement of the new year; and its institution is attributed to the celebrated Jemsheed, who, according to the traditions of the country, and the fragments yet preserved of its early native historians, was the sixth in descent from Noah, and the fourth sovereign of Persia, of the race of Kaiomurs, the grandson of Noah. . . . But to return to the feast of the Nowroose. It is acknowledged to have been celebrated from the earliest ages, in Persia, indepen-

dent of whatever religions reigned there; whether the simple worship of the One Great Being, or under the successive rites of Magian, Pagan, or Mahomedan institutions." (*Travels*, vol. i. p. 316.)

This equinoctial and solar year, as the writer proceeds to point out, is adhered to by the Persians, though they, being Mahomedans, also celebrate Mahomedan lunar festivals, and for many purposes make use of the Mahomedan lunar year.

It is easy to see how greatly the Persian Nowroose differs from the purely lunar Mahomedan anniversaries—anniversaries which in the course of about thirty-two and a half years necessarily make a complete circuit through the seasons. The difference, though not so marked, which exists between the purely solar Nowroose, and all soli-lunar festivals, such as those of the Babylonians, should also be taken note of. These last, like our Easter, were dependent on the phases of the moon, and were therefore "moveable." The Persian Nowroose, like our Christmas Day, is an "immoveable" festival—fixed to the day of the spring equinox.

Modern tradition concerning the distinctively Persian custom of celebrating the Nowroose would, if it stood alone, furnish very slight grounds on which to found a far-reaching theory; but historical evidence confirms this tradition to a great extent, by teaching us that the Median and Persian worshippers of Ahura Mazda, and of Mithras, certainly under the Sassinide dynasty, and almost with equal certainty under the Achæmenid kings, kept their calendar and celebrated their religious festivals in a manner differing from that of the surrounding nations; their months were not lunar, their years were not soli-lunar but distinctly solar, and the spring equinox was the date to which as closely as possible the beginning of their year was fixed.

In Darmesteter's translation of the *Zend Avesta* the Persian months are treated of in Appendix C, p. 33, and in Appendix D, p. 37, we read of the Persian years:—

“ L'année était divisée en quatre saisons, correspondant aux nôtres. Cette division ne paraît guère que dans les textes post-avestéens; mais il y a dans l'Avesta même des traces de son existence ancienne.

La division normale de l'année est, dans l'Avesta, en deux saisons, été et hiver ; l'été, *hama*, qui comprend les sept premiers mois (du 1^{er} Farvardîn au 30 Mihr, soit du 21 mars au 16 octobre). . . . Cette division a une valeur religieuse, non seulement pour le rituel, mais aussi pour les pratiques, qui varient selon la saison."

The worship of the Persian sun-god Mithras was introduced into Rome about the time of the fall of the Republic. How far this worship differed from that taught in the Zoroastrian writings we need not inquire ; however changed it may have been, it was evidently derived originally from a Persian or a Median source. The worship of Mithras, in spite of much opposition, gained many followers in Rome. The birthday of the sun-god was kept at the winter solstice, but the great festivities in his honour, "*the mysteries of Mithras*," were as a rule celebrated at the season of the spring equinox,¹

¹ Cumont, in the first volume of his *Monuments figurés relatifs aux mystères de Mithra*, p. 326, having spoken of the solstitial festival in honour of the birthday of the god, observes as follows : " Nous avons certaines raisons de croire que les équinoxes étaient aussi des jours fériés où l'on inaugurerait par quelque salutation le retour des Saisons divinisées. Les initiations avaient lieu de préférence vers le début du printemps, en mars ou en avril. . . ."

and were famous even among Roman festivals. Let us now turn our attention to the Tauric symbolism so closely connected with Mithraic observances in Rome.

A writer in the *Athenæum* thus describes a Roman Mithræum:¹ "Discovery was made during some excavations at Ostia of a handsome house containing among its various rooms a *mithræum*. . . . Into the kitchen opens a narrow and tortuous passage, from which by a small half-concealed staircase the *mithræum* is reached; . . . it is quadrangular and regular in shape, as is usually the case in buildings of the kind. Almost the whole length of the two lateral walls run two seats, and on the side opposite the door is seen a little elevation, which served as the place for the usual statue of Mithras in the act of thrusting his dagger into the neck of the mystic Bull. A very singular peculiarity of this little Ostian *mithræum* is that it is entirely covered with mosaics—pavements, seats, and walls alike. The various figures and the symbols are splendidly drawn, and all executed in black *tesseræ* on a white ground. Upon each side of the seats, turned to the entrance door, is figured a genius bearing a lamp, that is, the genius of the

¹ *Athenæum*, 1886, October 30 and November 6.

spring equinox, with the face raised, and that of the autumn equinox, with the face cast down. . . . It is known, in fact, that the whole myth of Mithras is related to the phases of the sun . . . hence are represented in the ground below the seats all the twelve signs of the zodiac, by means of the usual symbols, but each accompanied by a large star."

In the many sculptures of the Mithras group similar to that above described, which have been so well figured in Lajard's *Culte de Mithras*, various heavenly bodies are represented. The Scorpion (the constellation Scorpio of the Zodiac opposed to Taurus) joins with Mithras in his attack upon the Bull, and always the genii of the spring and autumn equinoxes are present in joyous and mournful attitudes.

In looking at these plates the conviction is clearly forced upon our minds that the Bull so persistently, and, it may be added, so serenely, slain by Mithras in these Roman representations, is the Zodiacial Bull, overcome, and as it were destroyed or banished from heaven, in the daytime by the sun-god, and at night by Scorpio, the constellation in opposition. With almost equal conviction we

arrive at the conclusion that this triumph of Mithras was associated traditionally—in Roman days¹ it could only have been traditionally—with the occurrence, at a remote date, of the spring equinox during the time that the sun was in conjunction with the constellation Taurus.

In the ruins of Persepolis, ruins of buildings designed, erected, and decorated by the worshippers of the supreme God Ahura Mázda, and of his friend and representative Mithras, Tauric symbolism abounds. We do not amongst these ruins find portrayals of Mithras as a youth wearing a Phrygian cap, and “thrusting his dagger into the neck of the mystic Bull,” but again and again, in the bas-reliefs adorning the walls, we do find a colossal being thrusting his dagger into the body of a still more “mystic” creature than the Bull of the Roman sculptures—a creature combining in one instance at least¹ the attributes of Bull, Lion, Scorpion, and Eagle, and frequently those of two or more of these animals.

Perrot and Chipiez have supposed this constantly repeated scene to represent imaginary

¹ See Plate IV.

PLATE IV.



Persepolis. Combat du roi et du griffon. Palais n° 3.
Perrot et Chipiez. *Histoire de l'Art dans l'Antiquité*,
Tome v. opposite page 547.

[To face p. 64.

contests between the reigning monarch and all possible or impossible monsters, but a very different impression was produced on the mind of Ker Porter by these same bas-reliefs ; and though he did not adopt a purely astronomic theory to explain them, he was firmly convinced that the combat depicted was not one waged between an ordinary human being and an ordinary or extraordinary animal, but that it was a symbolical representation of the combat constantly carried on by Ormuzd (Ahura Mazda), and by his representative Mithras, against the powers of evil and darkness.¹

With the astronomic clue to Persian symbolism

¹ "The man who contends with the animals . . . is represented as a person of a singularly dignified mien, clad in long draped robes, but with the arms perfectly bare. His hair, which is full and curled, is bound with a circlet or low diadem ; and his sweeping pointed beard is curled at different heights, in the style that was worn by majesty alone. . . . The calmness of his air, contrasted with the firmness with which he grasps the animals, and strikes to his aim, gives a certainty to his object, and a sublimity to his figure, beyond anything that would have been in the power of more elaborate action or ornament to effect. From the unchanged appearance of the hero, his unvaried mode of attack, its success, and the unaltered style of opposition adopted by every one of the animals in the contest, I can have no doubt that they all mean different achievements towards one great aim. . . ."—Ker Porter's *Travels*, vol. i. p. 672.

put into our hands by the Roman sculptures, of which mention has been made, and by a study of the researches of Lajard, it is not difficult to recognize in the composite animals represented on the bas-reliefs allusions not only to the Zodiacal Bull, traditionally associated with the spring equinox, but also to three other constellations which at the same date of the world's history (namely, from 4,000 to 2,000 B.C.) marked more or less accurately the remaining colures, *i.e.* the Lion, the Scorpion, and the Eagle.

The constellations of the Lion and the Scorpion, there can be no doubt, were appropriate star marks for the summer and autumn seasons, when the spring equinoctial point was in the Bull,¹ but as regards the Eagle it must be admitted that though it adjoins the Zodiacal Aquarius (the constellation in which the winter solstitial point was then situated), yet its principal stars lie considerably to the north and west of that constellation.

A reason for the substitution of the Eagle (*Aquila*) for the Zodiacal Water-man or Water-jar

¹ The solstitial and equinoctial colures were situated, speaking in round numbers, for 2,000 years in the constellations Taurus, Leo, Scorpio, and Aquarius.

(Aquarius or Amphora) may, however, be found in the fact of the very great brilliancy of the star Altair in the Eagle. It is a star of the first magnitude. In the Water-man there is no star above the third. The Persians, we are told, had a tradition that four brilliant stars marked the four cardinal points (*i.e.* the colures). In Taurus, Leo, and Scorpio we find stars of the first magnitude: there was therefore no temptation for Mithraic calendar makers and mythologists to seek for an extra-Zodiacal star to mark and represent the spring, summer, or autumn seasons; but for the winter solstice the only stars of the first magnitude within at all suitable distance were Aquila, to the north-west, or Fomalhaut to the south of Aquarius. For a nation dwelling as far to the north as the Medians are supposed to have done, Fomalhaut (when the winter solstice was in Aquarius very far to the south of the equator) would have been rarely visible. The choice by a Median astronomer and symbolic artist in search of a very brilliant star mark for the solstice would therefore have been restricted to the constellation of the Eagle, containing the conspicuous Altair, a star of the first magnitude.

The very constant association, not only in Persian and Median, but also in the mythologic art of other nations, of the Lion and the Eagle, seems to confirm the view here put forward, *i.e.* that the constellations of Leo and Aquila rather than of Leo and Aquarius were sometimes chosen to symbolise the summer and winter solstices.

The Griffin, a fabulous animal sacred to the sun, composed of a *Lion* and an *Eagle*, is a well-known figure in ancient classic art.

In Babylonian and Assyrian sculptured and glyptic art Merodach is often represented as in conflict with a Griffin. Merodach has been claimed by Jensen and other writers as a personification of the sun of the spring equinox. The for ever recurring triumph of spring over winter is probably figured in Merodach's triumph over the Griffin.

The association of Eagle and Lion is to be noticed in the arms of the city of Lagash; they were "a double-headed Eagle standing on a Lion passant or on two demi-lions placed back to back."¹ In Lagash, as was pointed out in a former paper, the new year's festival appears to have been held at the

¹ Maspero, *Dawn of Civilization*, p. 604.

winter solstice: such a supposition would furnish an astronomical interpretation for the arms of Lagash.¹

Mythological references to the Eagle alone are also to be met with which point to the Celestial Eagle (*Aquila*) marking the winter solstice in lieu of the constellation *Aquarius*, as for instance the Babylonian legend of the ambitious storm-bird, *Zu*,² who stole the tablets of destiny, and thus sought to vie in power with "the great gods." Here we may find allusions to the substitution (deemed by some,

¹ In this connexion the following passage from Sayce's *Hibbert Lectures*, p. 261, is interesting:—

A text copied for Assur-banipal, from a tablet originally written at Babylon, contains part of a hymn which had to be recited "in the presence of Bel-Merodach . . . in the beginning of Nisan,"—

" . . . O Zamama,
Why dost thou not take thy seat?
Bahu, the Queen of Kis, has not cried to thee."

He adds in a note that Zamama was the Sun-god of Kis, and was consequently identified with Adar by the mythologists. On a contract-stone he is symbolized by an eagle, which is said to be "the image of the southern sun of Kis."

It was claimed in a former paper (Feb. 1896) that "*the Southern sun*" was "*the sun of the winter solstice*," and that Gula (= Bahu) was the name of the constellation, or of some stars in the constellation *Aquarius* (V. p. 50). In these lines Bahu, as I have supposed, *Aquarius*, and Zamama, symbolised by the *Eagle, the image of the Southern sun or winter solstice*, are closely associated.

² Maspero, *Dawn of Civilization*, p. 666.

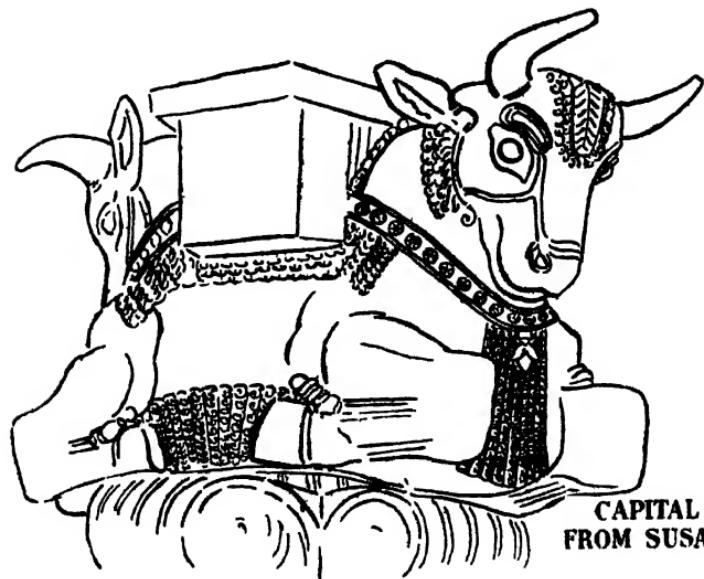
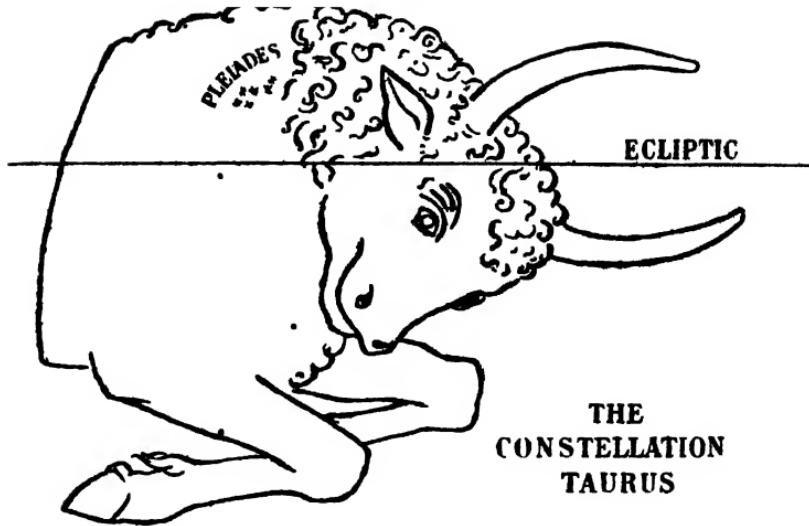
no doubt, unauthorized) of an extra-Zodiacal for a Zodiacal constellation.

Again, in Grecian mythology the Eagle is sent by Zeus to carry Ganymede up to heaven, and in Grecian astronomy Ganymede is placed in the constellation Aquarius. It does not therefore seem unreasonable to suppose that the Eagle associated in the Persepolitan bas-reliefs with the Lion, the Bull, and the Scorpion (as at Plate IV.), is the constellational Eagle, symbolizing the winter solstice, and that the compound animal is emblematic of the four seasons of the year, and also, it may be, of the four quarters of the world.

If to the composite monster of the bas-reliefs we ascribe an astronomic motive, we shall be ready to grant the same to other Tauric symbolisms prominent in the Persepolitan ruins.

With full conviction we shall recognize in the demi-bulls which crowned the columns in Persepolis and Susa representations of the demi-bull of the Zodiac. The resemblance is so striking that words are scarcely required to point it out when once the outlines of the two figures have been compared (Plate V.). In the spirited description of these

PLATE V.



capitals, quoted here from Perrot and Chipiez,¹ are some lines, marked with italics, which might be applied with exactness to the demi-bulls of the Zodiac.

“On ne saurait cependant ne point admirer le grand goût et l’art ingénieux avec lequel, dans ses bustes de taureau, il [l’artiste perse] a plié la forme vivante au nécessités de la décoration architecturale. Il a su la simplifier sans lui enlever l’accent de la vie ; les traits caractéristiques de l’espèce sur laquelle s’est porté son choix restent franchement accusés, quoique les menus détails soient éliminés ; ils auraient risqué de distraire et de troubler le regard. Les poils de la nuque et du dos, de l’épaule, des fanons, et des flancs sont réunis en masses d’un ferme contour, auquelles la frisure des boucles dont elles se composent donne un relief plus vigoureux ; en même temps le collier qui pend au col, orné de rosaces et d’un riche fleuron qui tombe sur la poitrine, écarte toute idée de réalité ; ce sont là des êtres sacrés et presque divins, que l’imagination de l’artiste a comme créés à nouveau et modelés à son gré pour les adapter à la fonction qu’elle leur donnait à remplir. Cependant, tout placé qu’il soit en dehors des conditions de la nature, l’animal n’a

¹ *Histoire de l’Art dans l’antiquité, Perse, p. 519.*

pas perdu sa physionomie propre. Dans le mouvement de *la tête, légèrement inclinée en avant et sur la côté*, on sent la force indomptée qui anime ce corps ample et puissant. Hardiment indiquées, la construction et la musculature des *membres inférieurs, repliés sous le ventre*, laissent deviner de quel élan le taureau se lèverait et se dresserait en pied, s'il venait à se lasser de son éternel repos. J'en ai fait plusieurs fois l'expérience au Louvre, devant la partie de chapiteau colossal que notre musée doit à M. Dieulafoy : parmi les visiteurs qui se pressaient dans cette salle, parmi ceux mêmes qui semblaient le moins préparés à éprouver ce genre d'impressions, il n'en est pas un qui n'ait subi le charme, qui de manière ou d'autre, n'ait rendu hommage à la noblesse et à l'étrange beauté de ce type singulier."

For the exquisite columns crowned by these Tauric capitals the same writers have claimed a distinctively Median origin. This claim they sustain at great length, and with much architectural learning. They show that in their proportions, and in every detail of their ornamentation, the Persepolitan differed from the Ninevite, Grecian, or Egyptian column. They also point out that nowhere except at Persepolis and at Susa is the

demi-bull of the capital to be met with; and yet they express the opinion that this feature, so far as is known proper to Persia, was mainly derived from, or helped at least by, the models of Assyria.

Very close resemblances can indeed be traced in Medo-Persian to Assyrian art, and as the Medo-Persian buildings, whose ruins are at Persepolis and Susa, were erected certainly at a later date than the palaces of the Assyrian kings discovered on the site of Nineveh, it is natural to attribute, as Perrot and Chipiez, and nearly all writers on the subject attribute, such resemblances to imitations of Assyrian art and symbolism on the part of the Medo-Persians.

There are, however, some considerations which make it difficult to adopt this view. In the first place, the symbolism supposed to have been copied by the Medo-Persians was religious symbolism, and the religion of the Aryan Medo-Persians was very different from that of the Semitic Assyrians.

The Achæmenid kings who built their palaces at Persepolis claimed constantly that they were worshippers of the one great Lord Ahura Mazda,

of whom Mithras was the friend and representative. That these kings should have adopted from the polytheistic Assyrians not only the Tauric symbolism above described, but also, as it is suggested, the emblem of their one great Lord Ahura Mazda from that of Assur (see Plate VI. figs. 1, 2, 3), would in itself be strange, but that they should have done so when Assur and all his followers had been utterly vanquished by the victorious worshippers of Ahura Mazda, seems still more improbable.

From the state in which the ruins of Nineveh were when discovered by Layard it is easy to see that, from the very day of the sacking of the city, it had for the most part been left just as it fell. It may have been rifled of its material wealth, but its literary and artistic treasures were left uncared for and undesired. A few hundred years later the very site of Nineveh was unknown.

The great city would not have been treated with such neglect had the Medo-Persian artists turned to it for inspiration and for themes of symbolic art with which to decorate the palaces of Persepolis.

PLATE VI.

FIG. 1.



The Assyrian god Assur.

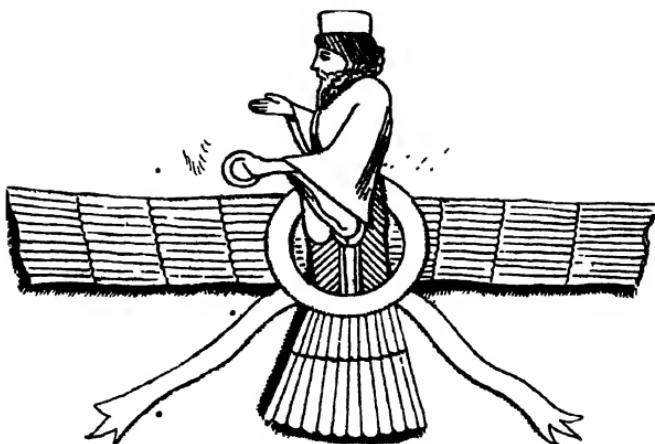
FIG. 2.



The Assyrian god Assur.

PLATE VI.

FIG. 3.



The Median god Ahura Mazda.

FIG. 4.



Western portion of Constellation Sagittarius and the Constellation Corona Australis.

The resemblance, however, between Medo-Persian and Ninevite art is in many instances so striking that some way of accounting for it must be sought, and those who are dissatisfied with one explanation will naturally look about to find some alternative suggestion.

The alternative suggestion I would now propose is that *the progenitors of the Assyrians at an early period of the world's history borrowed Tauric and other religious symbolisms from the ancestors of the Medes.*

In support of this theory the following considerations are put forward :

Tauric symbolism, if it is at all astronomic, points us back to a very remote date for its first institution, to a date considerably earlier than that at which the existence of the Assyrian people as an independent nation is generally put. The symbolism already discussed must, at the latest, have been originated about 2,000 B.C. Of the Assyrians as a nation we have no monumental proof earlier than 1,700 B.C.

But further, in the symbol of Ahura and Assur, I believe an astronomic reference may be traced

to the position of the colures amongst the constellations, a reference which points us back not merely to a date between 4,000 and 2,000 B.C., but rather, and with curious precision, to the furthest limit of the time mentioned, namely to 4,000 B.C.

To penetrate into the meaning of this symbol of Ahura we must study both the Median and Assyrian representations of the figure presiding over the winged disc, and we may also seek for further light to be thrown upon it by other references in Assyrian art to the god Assur.

Ahura presiding over the winged circle holds in his hand a ring or crown; Assur in some examples is similarly furnished; but more often he appears armed with bow and arrows. In this figure, variously equipped, I believe that the heavenly Archer, the Zodiacal Sagittarius (Plate VI. fig. 4), is to be recognized—Sagittarius, the constellation in which the autumnal equinoctial point was situated, speaking in round numbers, from 6,000 to 4,000 B.C.

The fact that a crown or wreath or ring often replaces the bow and arrows in the hand of Ahura and of Assur might at first sight make us doubtful as to the connexion of the figure with the constella-

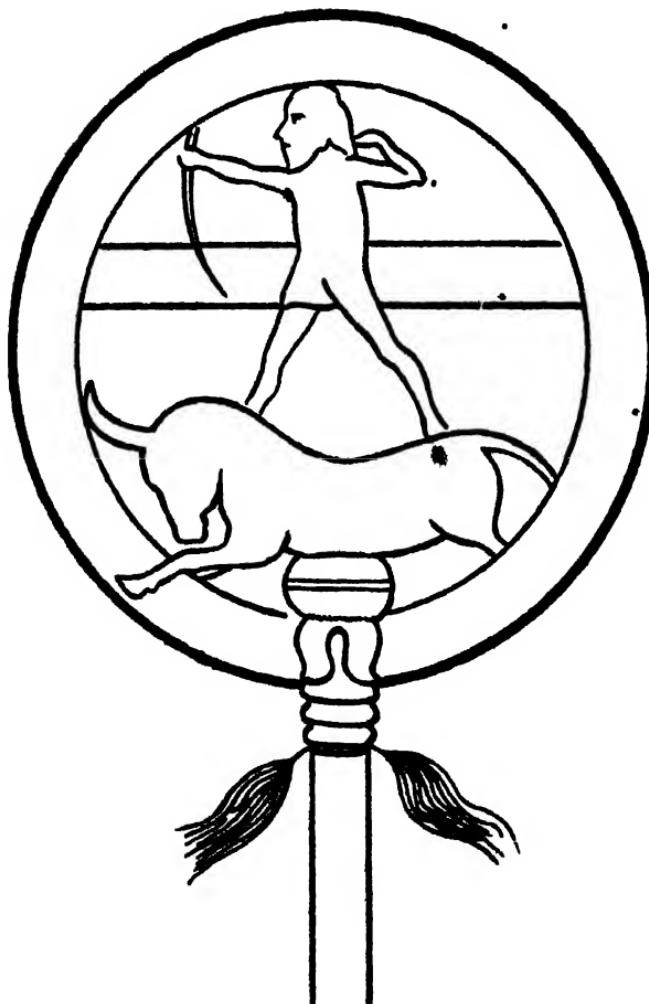
tion Sagittarius, but a glance at the celestial globe will rather make this fact tell in favour of the astronomical suggestion here made: for there we find close to the hand of the Archer the ancient Ptolemaic constellation Corona Australis (the Southern Crown), actually incorporated with the Zodiacal constellation Sagittarius.

Not only do Assur's bow and crown remind us of Sagittarius, but his horned tiara, resembling so closely that worn by the man-headed Assyrian bulls, inclines us to look for some astronomic and Tauric allusion in this Assyrian and Median symbol.

True it is that, speaking generally, Gemini and not Taurus is the constellation of the Zodiac opposed to Sagittarius, but owing to the irregularity in the shape and size of the portions assigned in the ecliptic to the Zodiacal constellations, the extreme western degrees of Sagittarius are opposed to the extreme eastern degrees of Taurus. Therefore about 4,000 B.C. the equinoctial colure passed through the constellations of the Archer and the Bull.

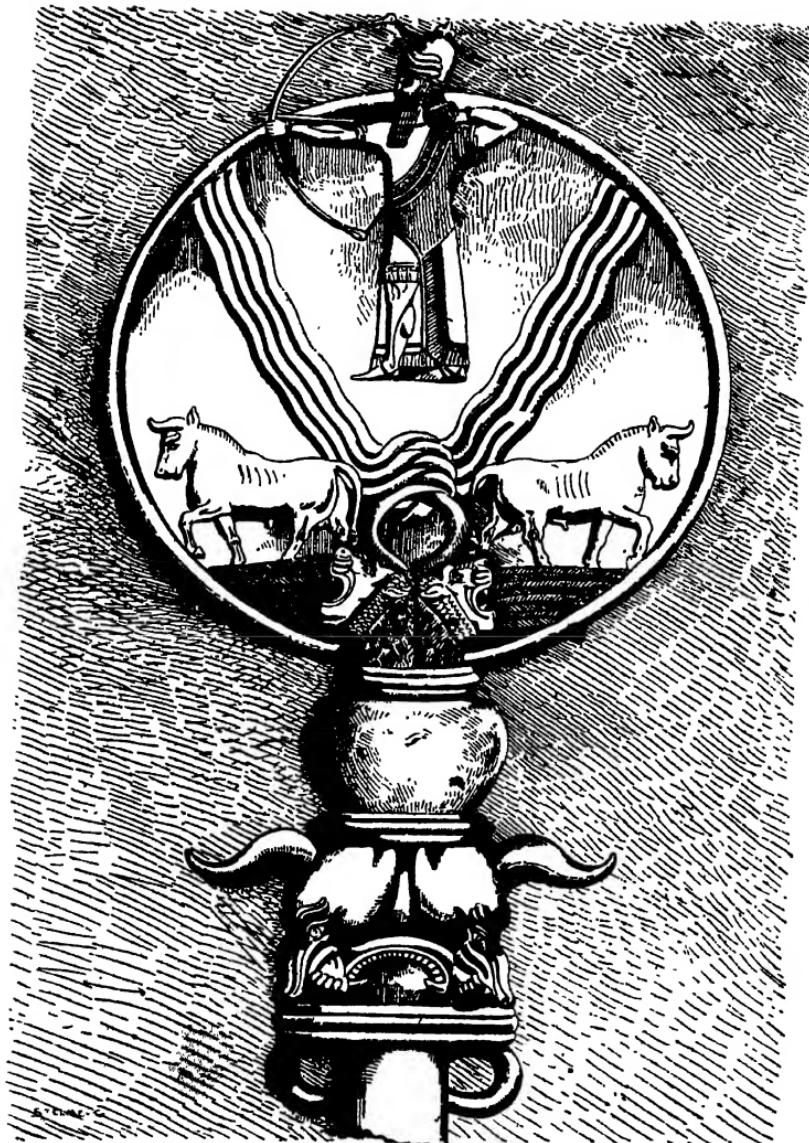
In the Assyrian Standard (depicted in Layard's *Monuments of Nineveh*, Plate XXII.)

we see the figure of an Archer above that of a galloping Bull, and in another Assyrian



Standard, that of Sargon II., we find not only

PLATE VII.



Standard of Sargon II., King of Assyria, 722-705 B.C.
Perrot et Chipiez. *Histoire de l'Art dans l'Antiquité*, Tome v.
opposite page 508.

[To face p. 79.]

the Archer and the Bull, the two constellations which 4,000 B.C. marked the *equinoctial* colure, but we may also clearly trace a reference to the two constellations which at the same date marked the *solstitial* colure, namely, those of the Lion and the Water-man (Plate VII.).

Here the *Archer* dominates over a circle in which symmetrically duplicated *Bulls* appear, and duplicated *Lions*' heads emerge out of what appears to be a hollow vessel resembling a *water jar*; the wavy lines that traverse the disc suggest streams that unitedly pour their waters into this jar. Below the jar again are to be seen halved and doubled heads, partly Lion and partly Bull.

This Standard of Assur may (like the Persepolitan monster earlier described) be considered as an astronomic monogram representing the four constellations which marked the four seasons of the year, and the four quarters of the earth.

The monogram of the Standard refers us back, however, to an earlier date for its origin than does the monogram of the composite animal in the Persepolitan bas-relief, for in the Standard the Archer is opposed to the Bull, in the bas-relief

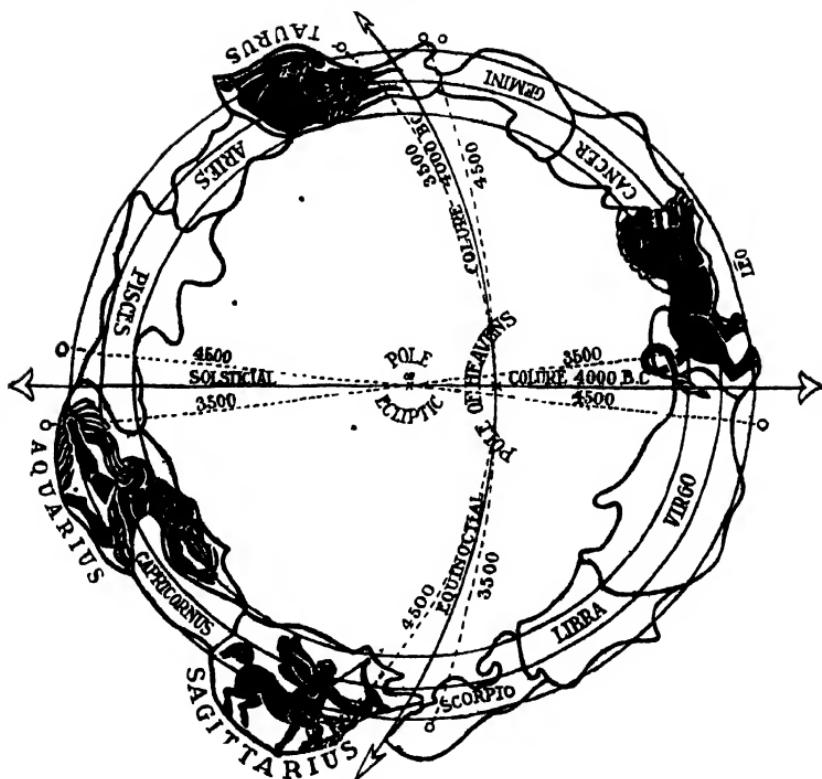
the Scorpion takes the place of the Archer, and the Eagle takes the place of the Water-man.

The precession of the equinoxes advances from east to west amongst the stars. Therefore the Scorpion marked the colure at a later date than did the Archer. The Eagle, as has already been pointed out, is considerably to the west of Aquarius, and could scarcely have been chosen as a substitute for that constellation when the colure was in its extreme eastern degrees.

At Plate VIII. is given the position of the colures at 4,000 B.C.; not much earlier or much later than this date can we place the *origin* of the symbolism in the Standard shown at Plate VII. Earlier *not* Leo and Aquarius, but Virgo and Pisces, would have marked the solstitial colure. Later *not* Sagittarius, but Scorpio, would have in opposition to Taurus marked the equinoctial colure.

At this date, 4,000 B.C., suggested with such curious accuracy by this Assyrian Standard, we have absolutely no trace of the existence of the *Semitic nation of the Assyrians* in Northern Mesopotamia. In Babylonia two hundred years later the Semitic Sargon I. ruled at Accad. In the

PLATE VIII.



Position of Colures amongst the Constellations at the dates
4,500-4,000 and 3,500 B.C.

[To face p. 80.

astrological work drawn up, if not for Sargon yet, as we may judge from internal evidence, for some king of Accad, no mention is made of the Assyrian nation.

The Phœnicians, the Hittites, the Kings of Gutium, and the "Umman Manda" are then the dreaded foes of Accad. Of the Manda we read as follows: "The Umman Manda comes and governs the land. The mercy seats of the great gods are taken away. Bel goes to Elam."

Professor Sayce is opposed to the view that the Manda are necessarily identical with the Medes; but he admits that Herodotus, following the authority of Medo-Persian writers, claimed as Median the victories of the Manda.¹

If now on the authority of Herodotus and the Medo-Persian writers we assume, at least as a possibility, that these Manda were Medes, we should expect to find them worshippers of Ahura Mazda. Ahura, it is on all hands admitted, is the Iranian form of the Vedic Asura, just as Mithras is the Iranian form of the Vedic Mitra. At whatever date the separation between Iranian and Vedic

¹ *Proceedings*, vol. xviii. Part vi. pp. 176, 177.

Aryans took place, the worship of Ahura (still probably under the form Asura) must have existed amongst the Iranians; indeed, many have supposed that the monotheistic reform which placed one great Ahura or Asura above all other Asuras, and above the Devas, occasioned the separation of these two great Aryan races.

It is for the Lord Ahura, called, as here supposed, Asura, in early times, by the Aryan Manda, that I would claim the astronomical symbol of the Archer presiding over the circle of the ecliptic, or, in other words, over the circle of the year, and of a year beginning at the spring equinox—a year, as has already been pointed out, distinctively Median.

According then to this supposition, a powerful Median race was established in the vicinity of Babylonia early in the fourth millennium B.C.—a race who worshipped one great Lord, first under the name of Asura, afterwards under that of Ahura.

It is for these Aryan Manda or Medes that I would claim, at the date of 4,000 B.C., the original conception of the astronomic monogram in which

so plainly may be read an allusion to the four constellations of the Zodiac, which at that date marked the four seasons and the four cardinal points, *i.e.* Sagittarius and Taurus, Aquarius and Leo. This monogram was used as a Standard thousands of years later by the Semitic Assyrians.

To the Manda or Medes, also, I would, as has been suggested, attribute the first imagining of the astronomic emblem common to Ahura and Assur—that of the divine Being presiding over the circle of the ecliptic.

Berosus mentions a Median dynasty as having reigned in Babylon for one or two hundred years. Let us now suppose that the Manda for more than a thousand years held power in *Northern* Mesopotamia, but that at last the tide of conquest turned, and after many struggles with the Semites in the south the Aryans were finally driven from the land now known as Assyria, and a Semite race firmly settled in the regions from whence in Sargon's time the Umman Manda had threatened the inhabitants of the Kingdom of Accad. That this was the case about 2,200 B.C. may perhaps be gathered from the monuments of Hammurabi, the

Semitic king of Babylon, for he refers in his letters to his troops in *Assyria*, and in a lately discovered inscription of this king he speaks of restoring to the city of *Assur* its propitious genie, and of honouring Istar in the city of Nineveh.

To account for the existence of the Assyrian nation, their close resemblance in language and race to the ruling Semitic class in Babylon, and yet to explain the great difference in the religion of these two peoples, has always been a difficulty.

The Assyrians worshipped, and worshipped with enthusiasm, all the Babylonian gods; but high above the whole Babylonian Pantheon they placed as their supreme and great Lord Assur—Assur whose very name is not to be met with in Babylonian mythology. This difficulty I would explain in the following manner.

When the Medes had, by Hammurabi or his successors, been driven out of Northern Mesopotamia, they were replaced by Semitic settlers who (like the settlers sent into Samaria more than a thousand years later by a king of Assyria) adopted, to a certain extent, the religion of the nation whom they had dispossessed. In 2 Kings xvii. we read

that in this parallel instance "the king of Assyria brought men from Babylon, and from Cuthah, and from Ava, and from Hamath, and from Sepharvaim, and placed them in the cities of Samaria instead of the children of Israel: and they possessed Samaria, and dwelt in the cities thereof." Later in the same chapter we read that in order to appease, as they believed, the wrath of the "God of the land," these idolatrous settlers, retaining in full the worship of all their own gods, added to it a worship of the Lord of the dispossessed Israelites.

I would suppose then that the polytheistic Semites, who in Hammurabi's time were settled in Northern Mesopotamia, had acted in a similar manner. Coming into a region where for nearly 2,000 years the monotheistic Medes or Manda had been established, they, to avert the wrath of the *god of the land*, adopted to a certain extent his worship. In fact, like the Samaritans, "they feared the Lord [Asura], and served their own gods."

This explanation of the difference in religion between the Babylonians and the Assyrians seems to yield also an explanation of the resemblances between the Assyrian and Median religions, or

rather of the resemblances between the religious art of the two peoples; and thus we return to the problem proposed for discussion earlier in this Paper, namely, the inadequacy of the generally held opinion which accounts for the resemblances in Persepolitan and Ninevite symbolic art by supposing that the Medes borrowed from the Assyrians.

In support of the alternative suggestion put forward at p. 75, that *the progenitors of the Assyrians at an early period of the world's history borrowed Tauric and other religious symbolisms from the ancestors of the Medes*, I would claim that the Assyrians borrowed not only religious symbolisms, but even the very name of their god Assur from the Medes. For I look upon Assur as a "loan word" adopted from the Aryan Asura.

To the Medes or Manda, who were, as has been argued, in power in Northern Mesopotamia about 4,000 B.C., I have attributed the origin of the astronomic Assyrian and Ahurian emblem. To them, on the same grounds, I attribute the first imagining of the astronomic Assyrian Standard, and the devising of the man-headed and

winged monsters so well known as "Assyrian Bulls"; and to them I would, with full conviction, leave the honour of having invented, and not borrowed, the idea of the magnificent Tauric capitals that crowned the columns of Persepolis and Susa.

To all these conclusions I have been led by a consideration of the distinctively equinoctial character of the Median calendar, taken in connexion with the importance given in Median art to the constellation Taurus.

V

ASTRONOMY IN THE RIG VEDA

[Reprinted from the Report of the *Actes* of the Twelfth Oriental Congress held at Rome].

Not much more than a hundred years ago the Sanscrit language began to yield to the study of Europeans some of its literary treasures. Almost on the moment, a controversy arose as to the antiquity of the science of astronomy in India; for scholars were amazed to find in this already long dead language many learned astronomical treatises, besides complete instructions for calculating, year by year, the Hindu calendar, as also for calculating horoscopes.

Some then proclaimed the wonderful facts revealed, and extolled the antiquity and accuracy of this Indian science, while others, noticing the many points of resemblance between European and Indian methods, supposed, and warmly advo-

cated the opinion, that much of the astronomy contained in Sanscrit works had been borrowed from the Greeks.

Sir William Jones was amongst the first to enter the lists against this Grecian theory; and he thus throws down his glove in defence of the antiquity and originality of the science of astronomy in India.

“I engage to support an opinion (which the learned and industrious M. Montucla seems to treat with extreme contempt) that the *Indian* division of the Zodiack was not borrowed from the *Greeks* or *Arabs*, but, having been known in this country (India) for time immemorial, and being the same in part with that used by other nations of the old *Hindu* race, was probably invented by the first progenitors of that race before their dispersion.”¹

Since Sir William Jones wrote this challenge, and supported it with whatever linguistic and scientific resources were at his command, volumes of heated controversy by many authors have been devoted to the same subject.

¹ *On the Antiquity of the Indian Zodiack. Complete Works*, vol. i. p. 333.

Just at present, however, an almost indifferent calmness has taken the place of the excited interest formerly manifested. The majority of scholars, both European and Indian, appear to have accepted, as an axiom, the opinion that much of Indian astronomy, and certainly the Indian acquaintance with the twelve-fold division of the Zodiac, is to be attributed to Grecian influence.

A minority of writers still hold the view advocated by Sir William Jones about a hundred years ago, and thus reiterated by Burgess (the translator of the Indian standard astronomical work the *Surya-Siddhânta*) in 1860. "The use of this (twelve-fold) division, and the present names of the signs, can be proved to have existed in India at as early a period as in any other country."¹

The minority who hold this view are so few at present that, as has been said, the majority rest in their opposed opinion in all the calmness of conviction.

I will now as briefly as possible state the chief arguments put forward, for and against, this conviction.

¹ *Journal of the American Oriental Society*, vol. vi. p. 477.

I. In favour of the comparatively late introduction into India of the twelve-fold division of the Zodiac, it is contended that the divisions of the Indian Solar Zodiac so closely resemble those of the Grecian (the Zodiac which we to this day depict on celestial globes), that it is not possible to believe that two nations or two sets of astronomers could independently of each other have imagined the same fanciful and apparently inconsequent series.

History does not tell of communication between Greece and India, sufficient to account for this similarity of astronomical method, till after the date of Alexander's conquest—about 300 B.C. The Greeks could not at that late date have first become acquainted with the figures of the Zodiac, for in Grecian literature of a much earlier age the figures of the Zodiac and other constellations are alluded to as already perfectly well known. As the Greeks therefore could not have learnt all their astronomic lore from the Indians, the Indians must have learnt theirs from the Greeks at some date later than Alexander's Eastern conquests.

A corroboration of this opinion is drawn from

the consideration that, in the most ancient Sanscrit work in existence—the purely Indian Rig Veda, containing no Grecian taint—the twelve-fold divisions of the Zodiac appear to be unknown. This opinion as to the Rashis or constellations of the Solar Zodiac is so generally adopted, that the age of any Sanscrit work in which mention of these Rashis occurs is at once—no matter what its claims to antiquity may be—set down as not earlier than the comparatively modern date of 300 B.C.

II. As regards the Indian Lunar Zodiac. The Indians make use at present for calendrical purposes, not only of the twelve-fold Solar Zodiac, they have also a series of 27 Nakshatras, or Lunar mansions (this is for convenience sake designated by European writers as the Lunar Zodiac). It is admitted on all hands that the Nakshatra series was not derived from Grecian sources. But it is contended that the fixation of the initial point of this Lunar Zodiac (a point at the end of Revatī and the beginning of Aswīnī, 10 degrees west of the first point of our constellation Aries) was due to an astronomical reform of the Hindu calendar,

probably carried out under Grecian auspices at a date not much earlier than 600 A.D. A very clear statement of this opinion is thus given by Whitney (the editor of Burgess' translation of the *Surya Siddhānta*) :—

“The initial point of the fixed Hindu sphere from which longitudes are reckoned, and at which the planetary motions are held by all schools of Hindu astronomy to have commenced at the creation, is the end of the asterism Revatī, or the beginning of Aṣvini. Its situation is most nearly marked by that of the principal star of Revatī . . . that star is by all authorities identified with ξ Piscium, of which the longitude at present, as reckoned by us, from the Vernal Equinox, is $17^{\circ} 54'$. Making due allowance for the precession (of the equinoxes), we find that it coincided in position with the vernal equinox, not far from the middle of the sixth century, or about A.D. 570. *As such coincidence was the occasion of the point being fixed upon as the beginning of the sphere, the time of its occurrence marks approximately the era of the fixation of the sphere, and of the commencement of the history of modern Hindu astronomy.*”¹

¹ *Journal of the American Oriental Society*, vol. vi. p. 158.

In further corroboration of this view—deduced from the astronomical supposition (to which I have drawn attention by *italics*) put forward in this extract—ancient Sanscrit literature is appealed to. Hymns and lists referring to the Nakshatras are to be met with in the Yajur and Atharva Vedas, in which *Krittikā*, now the third Nakshatra, holds the first place.

The Nakshatra *Krittikā* contains the group of stars known to us as the Pleiades. The most brilliant stars in the Nakshatra *Aswini* are the two stars in the head of the constellation Aries (the Ram), known to astronomers as α and β *Arietis*.

The vernal equinoctial point coincided about 2,000 B.C. with the constellation *Krittikā*. It is considered to be most probable that on account of this coincidence, at the early date when the hymns and list in question were composed, *Krittikā* was chosen as the leader of the Nakshatra series, and hence a similar reason for the later choice of *Aswini* as leader relegates it to a date not much earlier than 570 A.D.

These very briefly, as far as I have been able

to gather them, are the chief arguments in favour of—

(1) The Grecian introduction of the twelve-fold Zodiac into India about 300 B.C.

(2) The date of 570 A.D. for the fixation of the initial point of the Indian Zodiacs, and for the commencement of the history of Indian astronomy.

These propositions are based on cogent reasonings, and are maintained by very high authorities. The opponents of the modern theory have brought and bring forward the following considerations :—

“The *Bráhmans* were always too proud to borrow their science from the *Greeks*, *Arabs*, *Moguls*, or any nation of *Mléchch'has*, as they call those who are ignorant of the *Védas*, and have not studied the language of the Gods; they have often quoted to me (Sir William Jones) the fragment of an old verse, which they now use proverbially (*na níchò yavanátparah*), or, ‘no base creature can be lower than a *Yavan*,’ by which name they formerly meant an *Ionian* or *Greek*, and now mean a *Mogul1*

¹ Sir William Jones, *The Antiquity of the Indian Zodiack, Complete Works*, vol. i. p. 345.

Again the same writer points out that the resemblance between the Indian and the Greek Zodiac is—

“not more extraordinary than that, which has often been observed between our *Gothick* days of the week and those of the *Hindus*, which are dedicated to the same luminaries, and (what is yet more singular) revolve in the same order: *Ravi*, the Sun; *Sóma*, the Moon; *Maingala*, Tuisco; *Budha*, Woden; *Vrihaspati*, Thor; *Sucra*, Freya; *Sani*, Sater; yet no man ever imagined that the *Indians* borrowed so remarkable an arrangement from the *Goths* or *Germans*.”

These considerations put forward by Sir William Jones are further emphasized by the reflection that not only does the Grecian theory entail the improbability of the proud and jealous Brahmins adopting into their science and their mythology the teachings of foreigners; but that it also entails the greater improbability of the two rival Hindu sects, Brahmins and Buddhists, having at the same date and with equal enthusiasm adopted into their science and religious symbolism and calendars the same innovations.

Again the opinion of the Greek writers at the beginning of our era may be quoted as showing the high estimation in which, at that time of the world, Indian astronomy was held: as for instance in the life of Apollonius of Tyana (written about 210 A.D. by Philostratus), the wisdom and learning of Apollonius are set high above those of all his contemporaries; but from the sages of India he is represented as learning many things, especially matters of astronomy.¹

This high opinion held by Greeks in regard to Indian astronomy may be contrasted with the very moderate praise bestowed on the Grecian science by Garga, a Hindu writer of, it is supposed, the first century B.C. He says:—

“The Yavanas (Greeks) are Mlechchas (non-Hindus, or barbarians), but amongst them this science (astronomy) is well established. Therefore they are honoured as Rishis (saints); how much more then an astronomer who is a Brahman?”²

Somewhat to the same effect speaks a Hindu author of a later date, Varāhamihira, who wrote

¹ *Apollonius of Tyana*, Book iii. chapter 13.

² Romesh Chunder Dutt, *Ancient India*, p. 136.

an astronomical dissertation treating of five different works known to him on the science of astronomy. He says :—

“ There are the following Siddhântas: The Paulîśa, the Romaka, the Vâsiṣṭha, the Saura, and the Paitâmaha. Out of these five, the first two (the Paulîśa and Romaka, which appear to have been European treatises) have been explained by Lâṭadeva. The Siddhânta made by Paulîśa is accurate, near to it stands the Siddhânta proclaimed by Romaka; more accurate is the Sávitra (Saura)¹ (*Sûrya Siddhânta*, the *Hindu* standard work); the two remaining ones are far from the truth.”²

This moderate, and, as it reads, judicial opinion of Varâhamihira, touching the superiority of the native *Sûrya Siddhânta* over the Paulisa and Romaka Siddhântas, may be appealed to as not

¹ This opinion of Varâha has been confirmed by modern European scholars. Burgess (from whose translations of the *Sûrya Siddhânta* we have already quoted) remarks, “in regard to . . . the amount of the annual precession of the equinoxes, the relative size of the sun and moon as compared with the earth, the greatest equation of the centre of the sun, the Hindus are more nearly correct than the Greeks.” (*Journal of the American Oriental Society*, vol. vi. p. 480.)

² *The Pañcasiddhântikâ*. Edited by G. Thibaut, ch. i. § 3.

conveying the impression that when Varāha wrote his co-religionists and scientists were accepting, wholesale and with avidity, Grecian astronomic methods in place of their own already well-established native science. It is true that in Varāha's work many words evidently of Grecian origin are to be met with; and some scholars have claimed that these "Greek terms occurring in Varāhamihira's writings are conclusive proofs of the Greek origin of Hindu astronomy." That such terms should occur in a work professedly a *resume* of five astronomic treatises—some of them Indian, and some European—can scarcely be considered as conclusive proof that in the writer's time no purely Indian astronomic science existed. Varāha's writings suggest an author interested in comparing the resemblances and the differences to be met with in home and foreign methods, rather than one introducing for the first time important astronomic truths to the notice of his readers.

It may be further urged that the claims to antiquity in Sanscrit astronomical works are so well known, that those who adopt the Grecian theory must necessarily throw discredit in a very wholesale

manner on all their authors. Bentley's furious diatribes may be quoted as an extreme example of the way in which the evidence of such Sanscrit claimants to antiquity is sometimes dealt with ; and it may be pointed out that such violent denunciation cannot be looked on as convincing argument.

"The fact is," writes Bentley, "that literary forgeries are now so common in India, that we can hardly know what book is genuine, and what not : perhaps there is not one book in a hundred, nay, probably in a thousand, that is not a forgery, in some point of view or other ; and even those that are allowed or supposed to be genuine, are found to be full of interpolations, to answer some particular ends : nor need we be surprised at all this, when we consider the facilities they have for forgeries, as well as their own general inclination and interest in following that profession ; for to give the appearance of antiquity to their books and authors increases their value, at least in the eyes of some. Their universal propensity to forgeries, ever since the introduction of the modern system of astronomy and immense periods of years, in A.D. 538, are but too well known to require any further elucidation than those already given. They are under no restraint of laws, human or divine, and subject to

no punishment, even if detected in the most flagrant literary impositions.”¹

It is unnecessary now to further pursue the pros and cons of what has hitherto been said and written on the vexed questions as to the originality and antiquity of astronomy in India, and especially as to the Indian acquaintance with the twelve-fold divisions of the Zodiac, and the date of the fixation of the initial point in their Zodiac. We have seen that by the majority the Grecian and modern theory is the favoured one.

Within the last quarter of a century, however, an unexpected reinforcement has come into the field, in aid of the disheartened and nearly silenced minority, who still believe in a great antiquity for the science of astronomy in India.

The researches of archæologists in Western Asia have of late brought to our knowledge vast hoards of information concerning the ancient inhabitants of Babylonia and Assyria, and the surrounding highlands and plains; amongst other matters, concerning the science of astronomy possessed by these peoples.

¹ *A Historical View of the Hindu Astronomy, etc.*, p. 181.

In 1874, a Paper entitled *The Astronomy and Astrology of the Babylonians* was read by Professor Sayce before the "Society of Biblical Archæology," and since that date other Papers, by various authors, dealing with the subject have appeared in the same Society's *Proceedings*. Also in the *Zeitschrift für Assyriologie*, articles have been contributed by such writers as Epping and Strassmaier, Oppert, Mayer, Mahler, Jensen, Lehmann, and others, in which the calendars and astronomical methods in use in Mesopotamia are discussed.

Epping and Strassmaier's *Astronomisches aus Babylon* and Jensen's *Die Kosmologie der Babylonier*, are important volumes devoted to these same matters.

Whatever else concerning the subject of all these writings remains uncertain and open to discussion, some facts are clearly established. We now know that the inhabitants of Babylonia in a remote age (certainly as early as the fourth millenium B.C.) were acquainted with the twelve divisions of the Zodiac, and that these divisions were imagined under figures closely resembling in almost every instance those now depicted on our

celestial globes. The calendar used by the Accadians, and later by the Semitic Babylonians and Assyrians, was indeed based on the observance of the Zodiacal constellations and of the journeyings through them of the sun and moon. The varying positions of the planets, Mercury, Venus, Mars, Jupiter, and Saturn are also noted by references to the Zodiacal asterisms: and not only Zodiacal, but several of the extra-Zodiacal ancient constellations are represented on the monuments.

All this information gained from the cuneiform tablets concerning the science of astronomy in Western Asia must undoubtedly affect the judgment of enquirers into the history of the same science in India.

Now that it is clearly proved that 3,000 B.C. and earlier the twelve-fold fanciful signs of the Solar Zodiac were known to the inhabitants of Babylonia, it cannot any longer be asserted dogmatically that the inhabitants of India must have waited till 300 B.C. to learn this twelve-fold division from Grecian astronomers after the date of Alexander's conquest.

But again as regards the fixation of the initial

point of the distinctively Indian Lunar Zodiac, or circle of the Nakshatras, at the "end of Revatî, and the beginning of Aćvinî," that is to say, at a point not far from the first degree of Aries—cuneiform tablets teach us the important fact that long before the equinoctial point coincided with any of the degrees of Aries, that constellation was the leader of the Zodiacal series—inasmuch as the month Bar zig-gar (Accadian) the "Sacrifice of righteousness," that is, the month when the sun was in conjunction with Aries, always in the tablets appears as the 1st month of the year.¹

These late revelations of archæology seem to strike at the root of the main arguments relied on by the advocates of the Grecian and modern origin of astronomic science in India; and this being the case, it is possible to turn with unbiassed minds

¹ This fact is admitted (see art. "Zodiac," sub-heading "first sign," *Encyclopædia Britannica*). But it is a fact opposed to the hitherto received opinion touching the necessary connexion of the equinoctial point and of the initial point of the Zodiac. "A prehistoric reform" of the calendar is supposed, and corrections of the ancient texts to suit this reform, are suggested. Until traces of such reform and corrections can be shown to exist, the evidence of the tablets may still be cited as pointing to a year counted from the sun's entry into Aries, in the earliest ages of Babylonian civilization.

to a consideration of the teachings of Sanscrit literature, and endeavour to learn from them what is the real truth as to the acquaintance of ancient Indian authors with the figures of the Zodiac and other astronomic phenomena.

The opinion has been very generally adopted, as has been said, that in the Rig Veda there is no mention of any of the twelve figures of the Solar Zodiac. Some few writers have contended that occasional references to these figures are to be met with, and this question has been argued on etymological grounds. My entire ignorance of the Sanscrit language prevents me from at all following the arguments employed in this discussion. And here it may be said, and said with good reason, that for the discussion of points connected with Vedic literature, writers ignorant of the language in which the Vedas were composed are but ill equipped for the task. At every step I keenly feel my own disqualifications ; but many translations and commentaries on the Rig Veda are in existence ; and without entering into etymological questions, it has seemed to me that broad astronomic explanations of some of the

myths might be supplied, if only the possibility of the Vedic Rishis having been acquainted with the strange figures of the celestial sphere should be admitted. In this paper I am anxious to draw the attention of those who can study Vedic texts in their original language to these possible explanations. Those only who know Sanscrit are really qualified to judge finally whether the suggestions here made can be sustained on further enquiry into the Vedas. If the interpretations of Vedic myths here proposed are correct—no doubt corroboration will be found for them in the Sanscrit names and epithets of mythic personages. If no such corroborations are to be met with, the probabilities in favour of the correctness of the astronomic interpretations will be greatly diminished.

But to return to our subject. It is sometimes argued that the Vedic bards could not have been acquainted with the twelve-fold division of the Zodiac, as otherwise these great constellations would surely have claimed at their hands clear and outspoken notice. With this argument I cannot fully agree. Even before pointing out

the important place which I believe astronomical phenomena hold in the Rig Veda, I would draw attention to the fact that according to the generally received and non - astronomic explanation of the myths, it is necessary to suppose that still more striking and important natural phenomena than those connected with the constellations of the Zodiac — phenomena with which the Vedic bards must certainly have been acquainted—were almost entirely ignored by the authors of the Rig Veda. It is true that some great scholars claim on linguistic grounds a solar origin for much Vedic imagery and nomenclature ; yet when the hymns are examined in translations, and the notes and commentaries which accompany these translations are studied, the impression left on the mind of any reader unacquainted with Sanscrit must be that very little attention or honour is given to sun, moon, or stars, in comparison to that so freely lavished on the elements of fire, air and water, and on the mysterious properties of the juice of the Soma plant.

The beauty of the dawn is almost the only celestial glory that appears to appeal with any

insistence to the imaginations of the Vedic Rishis.

If out of the more than one thousand hymns of the Rig Veda, not one is addressed to the moon, and on the most liberal calculation considerably less than a hundred to the sun, under any aspect, it need not be cause for wonder if the constellations of the Zodiac are not remembered. The poets of the Rig Veda, however ignorant of astronomy, and at whatever age they lived, must have sometimes lifted their eyes above the sacrificial fire and its smoke, above the rain and storm-clouds, above their altars and libations of Soma. They must have often seen "the sun when it shined" and "the moon walking in brightness," and if they so rarely hymned these great luminaries with whose appearance and existence they so certainly were acquainted, it would prove no ignorance on their part of the twelve-fold division of the Zodiac and its quaintly imagined figures, were it indeed the case that all mention of these figures is absent from the Rig Veda.

But as has been stated above, my desire is to draw attention to possible astronomic interpre-

tations of many of the Vedic myths, and the adoption of such interpretations would necessarily entail a reversal of the dictum that all mention of the twelve-fold Zodiac is absent from the Rig Veda.

Those who have studied this wonderful and mysterious collection of hymns most constantly and deeply are obliged to confess that it is still very imperfectly understood, and though it is agreed unanimously that the Gods of the Veda are personifications of the phenomena of nature, yet as to the exact phenomena underlying the various Vedic myths there is among scholars much difference of opinion. It is impossible not to feel in reading the hymns and the many speculations, notes, and comments appended to them, that notwithstanding all the labour and research bestowed on the work, much of this ancient Veda still remains a cypher, for the right understanding of which the modern reader does not possess the key.

Guided by the teachings of archæology, I now make the suggestion that the key to this cypher may perhaps be found in crediting the authors of the Veda with a somewhat advanced

knowledge of astronomy, and an acquaintance with the, to us, apparently fanciful constellations of the celestial sphere and Zodiac; and in assuming that the figures of the "ancient constellations" often supplied the basis of Vedic imagery.

To pursue this possible clue towards the understanding of the myths, it were much to be desired that all students should be acquainted with the names and positions in the heavens of the forty-five constellations—so well distinguished by the epithet "ancient"—and that they should master some of the more easily observed conditions of their diurnal and annual apparent movements, as also those of the sun and moon, and further that they should have learnt what changes in the scenery of the heavens have been brought about by the slow movement known to astronomers as the "precession of the equinoxes."

Classical and philological scholars have however so rarely time and attention to spare from their own intensely interesting and important studies that as a rule astronomical phenomena are not much observed or considered by them. The accompanying diagrams drawn from a celestial

precessional globe may, it is hoped, enable those, who have not as yet devoted thought to such subjects, to judge for themselves of the reasonableness or otherwise of the following astronomic suggestions concerning the most important of the Vedic gods.

According to A. A. Macdonell — who in his late work *Vedic Mythology* has summed up clearly and compendiously the opinions of a host of scholars on the nature of the Vedic gods — Indra is the favourite national god of the Rig Veda; he is celebrated in 250 hymns, a greater number than that “devoted to any other god, and very nearly one-fourth of the total number of hymns in the Rig Veda.”¹

What may be called the central myths related of Indra, stripped of all epithet and ornament, relate that, invigorated by copious draughts of Soma, Indra fights with, overcomes, and drives from heaven and earth a demon called Vritra or Ahi, who is represented under the form of a dragon, serpent or water snake. Indra also searches for, finds, and releases cows which had

¹ Macdonell, *Vedic Mythology*, p. 54.

been stolen from the gods (or according to some commentators, from the angirasas, or priests). Indra bestows on his worshippers all the blessings of plenty, especially he is the dispenser of rain.

According to the usual non - astronomic explanations of these myths, Indra, an "atmospheric god,"¹ is "primarily the thunder god" who conquers "the demons of drought or darkness," or again, "Indra² is a personification of the phenomena of the firmament, particularly in the capacity of sending down rain. This property is metaphorically described as a conflict with the clouds which are reluctant to part with their watery stores until assailed and penetrated by the thunder - bolt of Indra; . . . the cloud is personified as a demon named Ahi or Vritra . . . a popular myth represents him (Indra) also as the discoverer and rescuer of the cows, either of the priests or of the gods which had been stolen by an *Asura* named Pañi or Vala."

Macdonell, alluding to the same incident, ob-

¹ Macdonell, *Vedic Mythology*, p. 66.

² Wilson, *Rig Veda*, Introduction, pp. xxx.-xxxii.

serves:¹ These "cows released by Indra may, in many cases, refer to the waters, for we have seen that the latter are occasionally compared with lowing cows. Thus Indra is said to have found the cows for man when he slew the dragon. . . . But the cows may also in other cases be conceived as connected with Indra's winning of light, for the ruddy beams of dawn issuing from the blackness of night are compared with cattle coming out of their dark stalls. Again, though clouds play no great part in the Rig Veda under their literal name (*abhra*, etc.), it can hardly be denied that, as containing the waters, they figure mythologically to a considerable extent under the name of cow (*go*), as well as udder (*udhar*) . . . thus the rain-clouds are probably meant when it is said that the cows roared at the birth of Indra."

At the close of the section devoted to Indra, Macdonell refers to the probably pre-Vedic origin of the Indra myths. He says:² "The name of Indra occurs only twice in the Avesta. Beyond the fact of his being no god, but only a demon,

¹ *Vedic Mythology*, p. 59.

² *Ibid.*, pp. 66.

his character there is uncertain. Indra's distinctive Vedic epithet *vrtrahan* [Vritra-slayer] also occurs in the Avesta in the form of *verethraghna*, which is, however, unconnected with Indra or the thunder-storm myth, designating merely the God of Victory. Thus it is probable that the Indo-Iranian period possessed a god approaching to the Vedic form of the Vrtra-slaying Indra. It is even possible that beside the thundering god of heaven, the Indo-European period may have known as a distinct conception a thunder-god, gigantic in size, a mighty eater and drinker, who slays the dragon with his lightning bolt."

In reading the Indra hymns in the Veda, and in trying to fit them to the explanation given in the passages quoted, a constant and very disagreeable strain is put on the imagination; it must, for instance, attempt to grasp and hold, at the same time, two very far apart opinions as to the nature of the demon Vritra. Vritra is to be thought of as a demon of darkness, and as a demon of drought; the cows are clouds, they are also ruddy beams of light!

Darkness and drought are not to be easily

bracketed together. Drought is in all lands, India not excepted, connected with a long continuance of bright and stainless skies. The appearance then of a little cloud "like a man's hand" is the joyously hailed precursor of "the sound of abundance of rain."

Again, the driving away of a snake-like cloud is no forcible simile by which to describe in myth the advent of rain in India—rain which to be of any use is no mere refreshing shower, but a long-continued downpour from clouds not hastily dispersed.

Indra's action first in driving away the cloud-demon Vritra, and then in seeking for the beneficial cloud cows, is also contradictory.

For the reconciling of many of these contradictions the astronomic interpretation of the Indra-Vritra myths is as follows:—Indra may still retain all his atmospheric attributes of sending down rain but—*Indra is primarily and essentially a personification of the summer solstice.*

The summer solstice in India is an all-important agricultural epoch; it brings with it "the rainy season," the real spring of the Indian year. Before

this season all the land is parched and arid, and vegetation is at a standstill.

The punctuality of the rains in many parts of India is so exact that the farmer foretells their arrival not only to the day, but to the hour. In good years heavy and almost incessant rain lasts for two or even three months. Indra, as a personification of the season which so punctually brings the rain, is an atmospheric god, the enemy of the demon of drought. But Indra is more than this: many praises are bestowed on Indra in the Rig Veda for deeds which cannot easily be explained on the simple atmospheric theory. "Indra is the highest of all" is the refrain of many Vedic verses; "Indra placed the sun high in the sky," "Indra tore off one wheel of the sun's chariot," "Indra stopped the tawny coursers of the sun." Now all these phrases are at once and clearly to be interpreted if we think of Indra as the personification of the summer solstice, and especially of the solstice in India, where at that season of the year the sun attains to the very zenith, and thus Indra associated with the *sun* under one figure of speech is spoken of as "highest

of all," and in a slightly varied figure associated with the *season*, is said to have "*placed the sun high in the sky.*" Or again translating into myth the very meaning of the word solstice or "*the sun being made to stand,*" we read that Indra "tore off the wheel of the chariot of the sun," and "stopped his tawny coursers." Indra is, I cannot but believe, not merely an atmospheric god; he is the god of the summer solstice. And if this should be the case, what then may Vritra be? Is the demon of the solstitial Indra personified as only a snake-like cloud? It is impossible to think so. The astronomic interpretation of the myth I would propose is that — *a snake-like constellation*, not a snake-like cloud, is the representation of the demon Vritra.

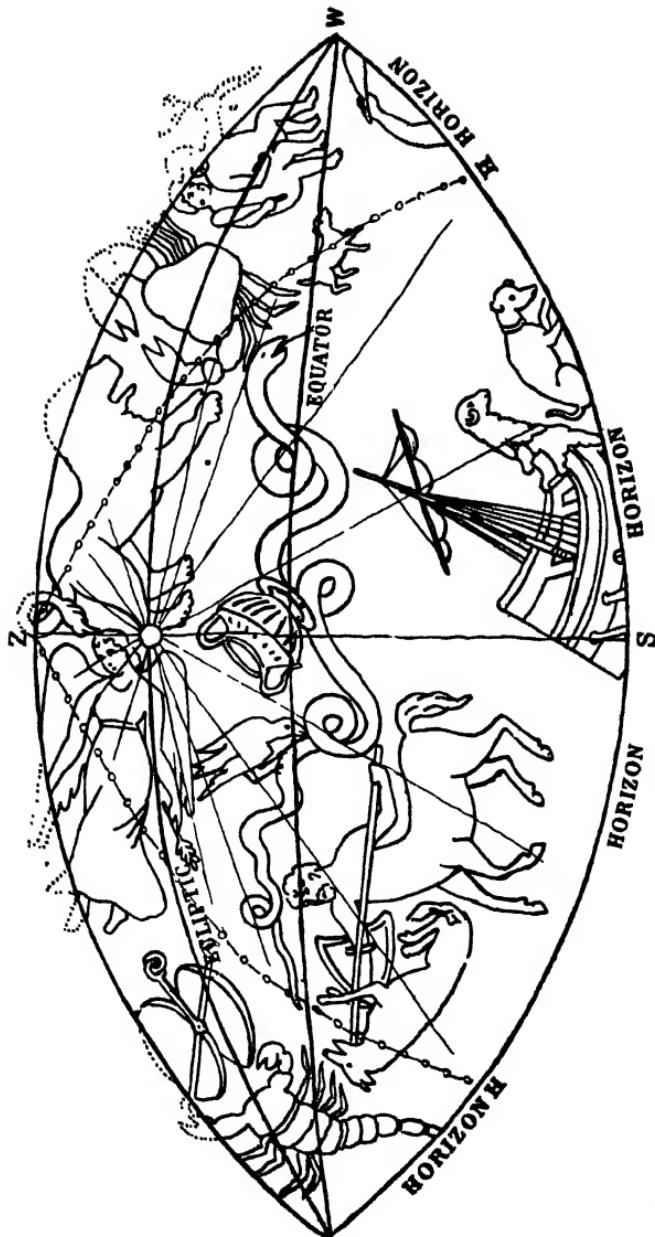
On the celestial sphere many serpents and dragons are represented, but the far-reaching constellation Hydra exceeds all the others in its enormous length from head to tail. No very brilliant stars mark the asterism, nor in the grouping of its stars is there anything especially snake-like. For some reason other than its appeal to the eye did astronomers of old invest with all

the horrors of the Hydra-form the monotonous length of this space on the vault of the skies.

This reason may be arrived at, with almost certainty, in studying, with the help of a precessional globe, the position in the heavens of this constellation in different ages of the world's history. So studying, we shall find that 4,000 B.C. — or to be more precise, one or two hundred years earlier—Hydra extended its enormous length for more than 90° symmetrically along one astronomically important (though invisible) mathematical line—the line of the heavenly equator—and was at the same date accurately bisected by another equally important mathematical line, namely the colure of the summer solstice (see Plate IX.).

Almost irresistibly, as it appears to me, the conviction forces itself on the mind, in considering the position held by the constellation Hydra 4,000 B.C., that it was at that date that this baleful figure was first traced in imagination on the sky, there fitly to represent the power of physical (and may we not suppose also, of moral?) darkness—a great and terrible power—but a power ever and

PLATE IX.



Position of the Sun amongst the Constellations at Summer Solstice, 4,000 B.C. Observer in Lat. 40° N.
Constellations between the lines H Z and Z H invisible all through the night of Summer Solstice.

[To face p. 118.]

ever again to be conquered by the victorious power of light. In astronomic myth this power was represented as that of the sun at the season of its highest culmination, the season of the summer solstice. For an observer in the temperate northern zone all through the long nights of midwinter, the whole length of the dreadful Hydra was at the date named visible above the horizon. The dark midwinter season was therefore the time of the Hydra's greatest glory. At every season of the year, except at that of midsummer, some portion of the monster's form was visible during some part of the night. But at the summer solstice no star in the constellation might show itself for ever so short a time.¹

The supposed latitude of the observer in Plate IX. is 40° N., a latitude considerably to the north of any part of India; but it is to be remembered that the Indra-Vritra myth cannot be claimed with any certainty as a purely and originally Indian myth, for, as Macdonell points out (as quoted above), there

¹ Plate IX. represents the constellations above the horizon, *but invisible at noon at the midsummer solstice.* It therefore represents those above the horizon, *and visible at midwinter midnight.*

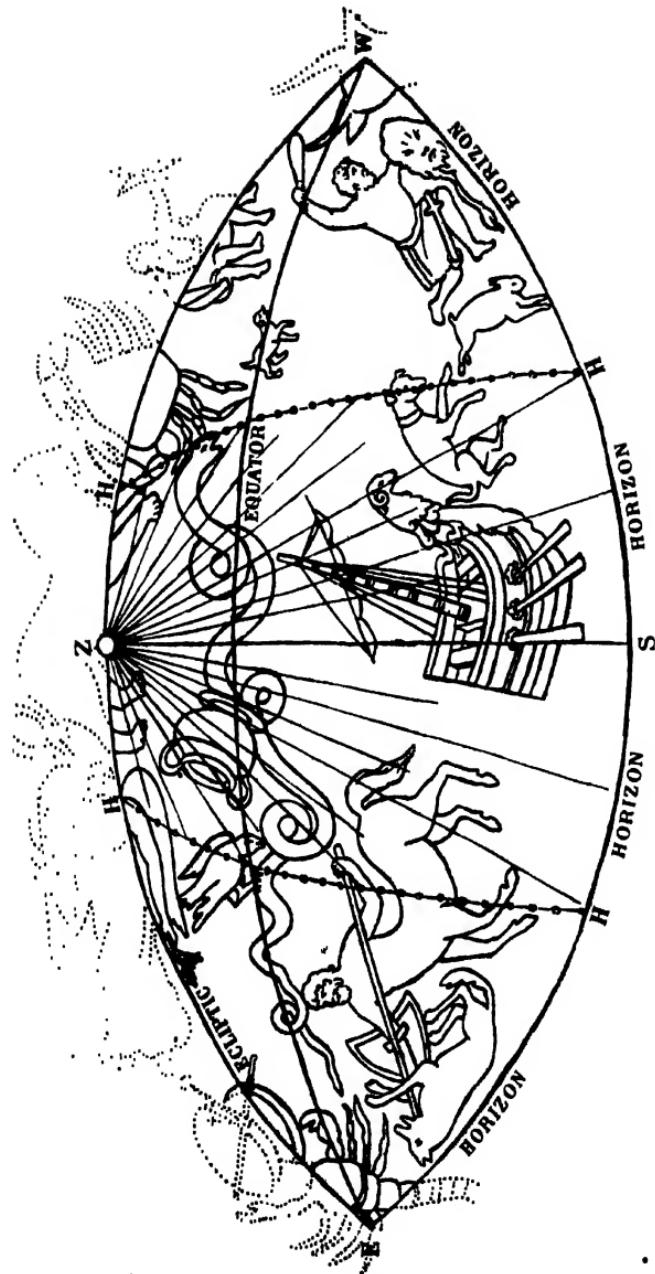
is a probability that "the Indo-Iranian period possessed a god approaching to the Vedic form of the Vrtra-slaying Indra," and that "it is even possible that beside the thundering god of heaven, the Indo-European period may have known as a distinct conception a thunder-god, gigantic in size, a mighty eater and drinker, who slays the dragon with his lightning bolt."¹

For the *origin* of this world-wide myth, therefore, we should not look to the tropical Indian Zone; but it is in Indian latitudes that we should look for an explanation of the physical phenomena *hymned by Vedic bards in the distinctly Indian development of the Indra-Vritra myth*. I believe that in thus tracing the course of the Indra story from temperate to tropical latitudes, we shall find a reason for the contradictory attributes assigned to the demon Vritra, namely those of darkness and drought.

In northern latitudes winter is distinctly the *dark season*; in tropical India there is little or no perceptible difference between the darkness of winter and summer. But in India winter is dis-

¹ V. p. 114.

PLATE X.



Portion of Sun at Summer Solstice, 3,000 B.C. Observer in Lat. 23° N.
Constellations between the lines H H Z and Z H H invisible all through the night of Summer Solstice.

[To see p. 101.

tinctly the dry season. Midsummer is the all-important season of the rains. Indra's conquest over Vritra, or the arrival of solstitial rains, marked by the disappearance of the constellation Hydra from the sky, was mythologically in the Vedas described as Indra's conquest over the demon of *drought*, but still traditionally—for the power of tradition is great—even in India Indra retained the attributes of the conqueror over the demon of *darkness*.

At Plate X. a drawing is given of the southern heavens and of the constellations—invisible at midsummer and visible at midwinter, above the horizon of an observer in latitude 23° N. at the date 3000 B.C., a thousand years later than the date referred to in Plate IX. For reasons which will appear more clearly when we come to the discussion of the Soma myth, it is to about this date that I would attribute the composition of many of the Vedic hymns.

But if Indra is to be considered as representing the summer solstice, and Vritra as representing the constellation Hydra, we must surely expect some astronomic interpretation for Soma—Soma by which

the mighty Indra is invigorated and enabled to triumph gloriously over the demon. According to non-astronomic explanations, "the concrete terrestrial plant and the intoxicating juice extracted therefrom" are considered to be the basis of the mythology of Soma. It is admitted that in post-Vedic literature Soma is a regular name of the moon, which is regarded as being drunk up by the gods, and so waning. Some writers point to the possibility that even in the Rig Veda, "in the Soma hymns there may occasionally lurk a veiled identification of ambrosia and the moon, . . . but on the whole, with the few exceptions generally admitted, it appears to be certain that to the seers of the Rig Veda the god Soma is a personification of the terrestrial plant and juice."¹

One German writer, Hillebrandt, very strongly upholds the view that Soma in the Rig Veda "often personifies the moon,"² and especially according to him is this the case in the 114 hymns of Maṇḍala IX., all addressed to Soma

¹ Macdonell, *Vedic Mythology*, p. 113.

² *Ibid.*

pavamāna, or "purified Soma," prepared for and quaffed by Indra to invigorate him for the Vritra combat.

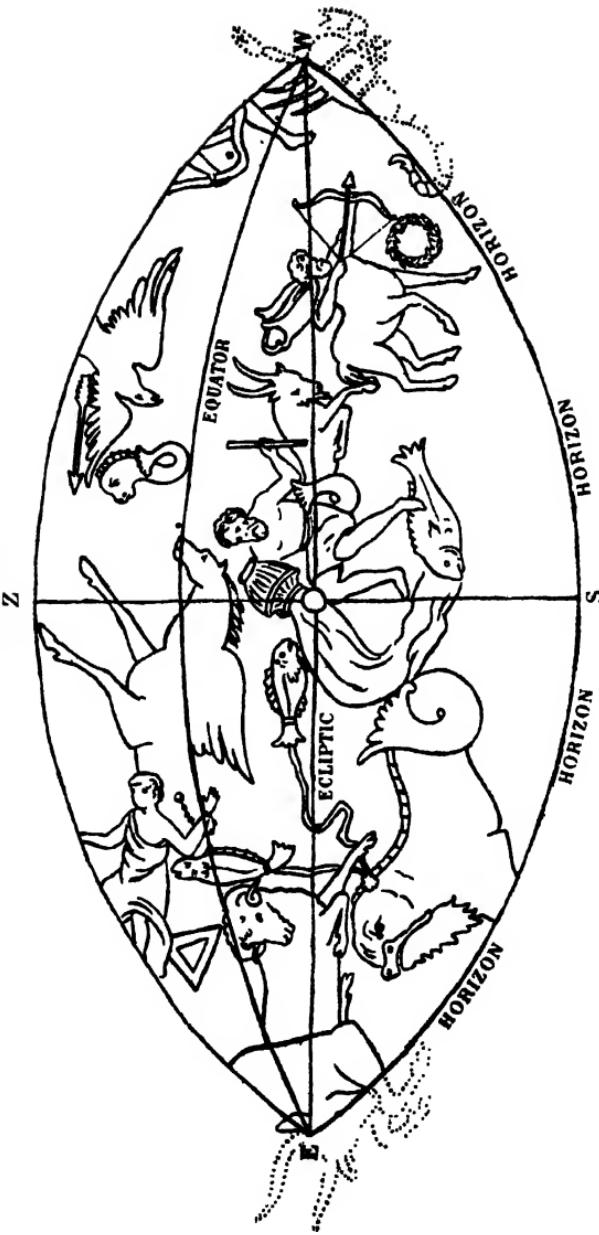
That Soma in the Rig Veda is primarily the moon, and that the moon is symbolized and always more or less directly referred to in the Vedic hymns to Soma, fits in, as must be evident to the readers of this paper, with the astronomic theories advocated in it. If we consider that Indra's conquest over Vritra represents the god of the summer solstice, with his bright weapons, conquering, and driving from heaven and earth the constellation Hydra, we can easily understand how in this contest Indra might be strengthened by copious draughts of Soma, *i.e.* by the bright light of the full moon flooding the heavens with radiance and enfeebling all but the brightest stars.

But a further confirmation of the lunar character of Soma, and an elucidation of the imagery of the Soma pavamāna hymns of Maṇḍala IX., are to be found if—still crediting the Vedic Rishis with a knowledge of the ancient constellations—we study the position of these constellations at the date

3,000 B.C. (see Plate XI.)¹ At that date the full moon of the midsummer or solstitial season was always to be observed in the constellation Aquarius. With this thought in our mind as we read the mystical hymns of Maṇḍala IX., in which Soma is so often described as rushing impetuously to the vase or pitcher, and as surrounded by celestial waters, with many other such expressions, we easily recognise an allusion to the *midsummer full moon in the constellation Aquarius*; and when further we read the legend so often repeated, that the eagle brought the Soma to Indra, or to the sacrifice, we have only to look at the celestial globe to see the eagle (Aquila) directing its flight towards the pitcher of Aquarius—and to remember that the very night before the moon attained the celestial vase, it would have been on the same meridian as the constellation Aquila; and the imaginative Vedic bard might then describe it as borne along by the eagle,—one of the most glorious constellations in that part of the sky.

¹ Lunar dates are variable. The full moon *nearest* to the summer solstice might have been observed somewhat to the east or the west of its position in the diagram, but always in the constellation Aquarius.

PLATE XI.



Position of Moon amongst the Constellations at Summer Solstice, and of the Sun at Winter Solstice, 3,000 B.C. Observer in Lat. 23° N.

[To face A. 14.

In one hymn especially devoted to the legend of the Soma-bearing eagle (or hawk), allusion to the small but well-marked-out constellation Sagitta (the arrow) may be detected. In Wilson's translation of Maṇḍala IV. 27 (vol. iii. p. 174), we read: "When the hawk screamed (with exultation) on his descent from heaven, and (the guardians of the *Soma*) perceived that the *Soma* was (carried away) by it, then, the archer Kriṣánu, pursuing with the speed of thought, and stringing his bow, let fly an arrow against it."

Now to turn to another important Vedic deity, Agni.

Agni is classed, according to Macdonell, amongst terrestrial gods, but he points out that in some passages he is to be identified with the sun. Wilson describes Agni as comprising¹ "the element of *Fire* under three aspects: 1st, as it exists on earth, not only as culinary or religious fire, but as the heat of digestion and of life, and the vivifying principle of vegetation; 2nd, as it exists in the atmosphere, or mid-heaven, in the form of lightning; and 3rd, as it is manifested in the

¹ Wilson, *Rig Veda*, Introduction, vol. i. pp. xxvii.-xxviii.

heavens, as light, the sun, the dawn, and planetary bodies." And—having enumerated various deities who in the hymns appear as manifestations of the sun—he adds, "still, however, the sun does not hold that prominent place in the *Vaidik* liturgy which he seems to have done in that of the ancient Persians, and he is chiefly venerated as the celestial representative of Fire."

The classification of Agni as a terrestrial god, given by Macdonell, and the order of his "aspects," as given by Wilson, are not in accordance with the theory here advocated, nor, according to Macdonell, is it the classification or order always adhered to by Vedic authorities.

For some very puzzling myths concerning Agni, I believe an astronomic interpretation may be given, and thereby the position of Agni in the *first* place, rather than in the *last*, as a celestial god, may be established.

The Vedic deity Apām Napāt—the son of Waters, is classed by Macdonell as an atmospheric god, and he says,¹ "In the last stanza of the Apām napāt hymn, the deity is invoked as Agni, and must be identified with him," and again,² "Agni's

¹ *Vedic Mythology*, p. 70.

² *Ibid.*, p. 92.

origin in the aerial waters is often referred to. The 'son of waters' has, as has been shown, become a distinct deity." Then turning to other legends regarding Agni he says, "In such passages the lightning form of Agni must be meant. Some of the later hymns of the Rig Veda tell a legend of Agni hiding in the waters and plants, and being found by the gods. . . . In one passage of the Rig Veda also it is stated that Agni rests in all streams; and in the later ritual texts, Agni in the waters is invoked in connexion with ponds and water-vessels. Thus, even in the oldest Vedic period, the waters in which Agni is latent, though not those from which he is produced, may in various passages have been regarded as terrestrial. . . . In any case the notion of Agni in the waters is prominent throughout the Vedas."

To explain this legend, Wilson makes other suggestions. He writes:¹ "The legend of his (Agni's) hiding in the waters, through fear of the enemies of the gods, although alluded to in more than one place, is not very explicitly related the allusions of the *Suktas* (hymns) may be a figurative intimation of the latent heat existing in water, or a misapprehension of a natural phenomenon which seems to have made a great impression in later times—the

¹ Wilson, *Rig Veda*, Introduction, vol. i. p. xxx.

emission of flame from the surface of water either in the shape of inflammable air, or as the result of submarine volcanic action."

It cannot but be admitted that these myths are puzzling, and that to account for the notion so prominent throughout the Vedas of "Agni in the waters," the various suggestions of "lightning," "latent heat existing in water," "the emission of flame from the surface of the waters, either in the shape of inflammable air or as the result of submarine volcanic action," are inadequate to explain the fact that Agni, whose very name "is the regular designation of fire"¹ should in the hymns be so closely associated with water. Nor are the difficulties concerning "Agni in the waters" to be overcome by the tempting and poetic suggestion, put forward by some writers, that in these passages reference is made to the sun rising in the morning out of the ocean, and again hiding itself beneath the waves at sunset. The composition of the Rig Veda is attributed to Aryan settlers "scattered over the Punjab and regions lying to the west of the Indus": by such settlers the

¹ Macdonell, *Vedic Mythology*, p. 88.

sun could never have been seen *rising* out of the ocean, for no ocean bounded their horizon on the east. Even the phenomenon of the sun hiding itself at evening in the water, could only have been observed by those who lived on the western *coast*, and it is therefore not easy to imagine why sunrise and sunset should in India have been so closely and constantly associated with a sea horizon.

But if once the acquaintance of the originators of the Agni myths with the Zodiacal figures is admitted, the astronomic interpretation of those relating to Agni in the waters is not difficult; it is as follows :

Agni is the personification of fire, but his chief personification is as the fire of the sun. "*Agni in the waters*" is especially the fire of the sun in the celestial waters of Aquarius. 3,000 B.C. the sun was in conjunction with Aquarius at the time of the *winter solstice*.¹ Those hymns therefore which dwell upon the myths of Agni hiding himself in, being born in, and rising out of the waters,

¹ The position of the sun at the *winter solstice* 3,000 B.C. was identical with that represented at Plate XI. as the position of the full moon at the *summer solstice*.

may be considered as hymns referring to *the sun at the winter solstice in conjunction with the constellation Aquarius*, and therefore as hymns especially suitable for use on the occasion of a great yearly festival held at that season of the year.

European writers often describe the mid-winter sun as *hiding* itself, or as every day withdrawing itself more and more from view. In poetic similes, the snows of winter often crown the head of the aged out-going year, while the in-coming year is represented as a *babe* or *infant*. The appropriateness of such similes is due to the fact, that our calendrical new year is fixed within a few days of the winter solstice. Again, in sober prose, the sun at the time of the winter solstice is said, having attained its lowest point, *to rise* or *begin its upward course* on the ecliptic. It is therefore not difficult to understand how the Vedic Rishis, who appear to have combined the characteristics of poets and of scientific observers of the heavens, should have 3,000 B.C. described *the fire of the solstitial sun, as hiding in, being born in, and rising out of the celestial waters of the constellation Aquarius*.

In this Agni myth, as in that of Indra, we may perceive traces of a pre-Vedic origin. The latitudes in which the Rig Veda was composed are not those in which attention is forcibly drawn to the diminution of the strength and visibility of the sun at the winter season. In the Rig Veda, however, Indra's conquest over darkness as well as over drought is celebrated, and the same *traditional* cause may be assigned for the description of Agni hiding himself at the time of the winter solstice in the waters of Aquarius.

Indra, Soma, and Agni no longer hold the important place in the Hindu Pantheon which they appear to have held in Vedic times, and on the astronomic theory, this fact may partly be accounted for by noticing how slow but inevitable changes in the scenery of the heavens, produced by the precession of the equinoxes, gradually obscured more and more completely the meaning of the *imagery* employed in the hymns to these deities. Indra, if he represents the summer solstice, is indeed still as powerful as ever, and still triumphs over the demon of drought, but no longer is that demon well represented by the

snake-like constellation Hydra; for on the night of the summer solstice, after the sun has set, the whole of Hydra is still above the horizon. No longer does the mid-summer full moon bathe its brightness in the celestial waters of Aquarius, nor does the mid-winter sun hide itself in them. The hymns remain, the phenomena they referred to, exist no longer.

But leaving now the subject of the "ancient constellations" and of reference to them in the Rig Veda, let us turn to the second section of the argument in favour of the modern origin of Hindu astronomy as stated above.¹ It is a claim made for the very modern date of 570 A.D. as that for the fixation of the initial point of the Indian Zodiac at the "end of Revatî and the beginning of Açvini."—This claim I desire to oppose.

It has been admitted by scholars, but almost with a sort of reluctance, that mention is made of some of the Nakshatras in a few of the Rig Veda hymns. The matter is rather avoided than cordially enquired into. It is, however, a question

¹ V. p. 92.

of great and important interest to ascertain, if possible, whether the circle of the Nakshatras was known to the Vedic Rishis, and if it were known, whether the initial point was fixed there, where as we have read, *all schools of Hindu astronomy agree in declaring that the planetary motions commenced at the creation.*¹

We have learnt from Babylonian archæology that we are no longer forced to assume that only at the date of about 570 A.D. could this initial point have been fixed by Indian astronomers. It therefore need no longer be looked upon as an unreasonable quest to search in the ancient pages of the Rig Veda for indications that this important astronomical point had been fixed, even before Vedic times, as the starting-point of a calendrical and sidereal year—and if we should find such indications in the Rig Veda, they may well out-weigh arguments against the antiquity of this fixation, based upon passages in later works, such as the Yajur and Atharva Vedas.

From the Yajur Veda itself, arguments may be drawn in favour of a year beginning in the

¹ V. p. 93.

month Chaitra,¹ at or before the date of the composition or compilation of that Veda.

In the Taittirīya Sanhitā (contained in the Yajur Veda) a passage occurs² which is translated and commented upon by B. G. Tilak (*The Orion, or Antiquity of the Vedas*, p. 46 *et seq.*). In this passage is discussed the superior suitability of three different days on which worshippers might consecrate themselves for the yearly sacrifice. Not any one of these three days has any connexion with the *spring equinox* or the sun's conjunction with Krittikā. The choice of date for the yearly sacrifice appears to lie between, first, the "Ekāṣṭakā (day)" of some month not named,³ but one in the "distressed," or "reversed" period of the year, *i.e.* the mid-winter season; second, the full moon of Phalgunī; and third, the Chaitra full moon. B. G. Tilak, after some pages of comment on the passage referred to, states in his summing

¹ Chaitra is the month which begins, as closely as a luni-solar month may, at the sun's arrival at the initial point of the Hindu Zodiac—the beginning of Aswini.

² Taittirīya Sanhitā, vii. 4. 8.

³ At p. 48 he quotes authorities in favour of the Ekāṣṭakā (day) in this passage meaning the 8th day of the dark half of Mâgha.

up, amongst others, the following conclusions which he has arrived at.

“ 1st, that in the days of the Taittirîya Sanhitâ the winter solstice occurred before the eighth day of the dark half of Mâgha . . . and that throughout the whole passage the intention of sacrificing at the beginning (real, constructive, or traditional) of the year is quite clear: 2nd, that the year then commenced with the winter solstice”: “ 3rd, that as there can not be three real beginnings of the year, at an interval of one month each, the passage must be understood as recording a tradition about the Chitrâ full moon and the Phalgunî full moon being once considered as the first days of the year.”

This is B. G. Tilak’s conclusion; merely judging from the *translation*, the passage might, as it seems to me, be understood as unreservedly recommending the full-moon of Chaitra as the most suitable for the beginning of the sacrifice, for in the text of the Taittirîya Sanhitâ it is said of it, “ It has no fault whatsoever.”

But in whichever sense the words are understood, this passage from the Yajur Veda may be set against the hymns and lists in the Yajur and

Atharva Vedas, above alluded to,¹ in which Krittikā is celebrated in the first, and Aswini in the twenty-seventh place.

The fact that the evidence as to the beginning of the year "in the days of the Taittirīya Sanhitā," is, as it seems, so uncertain, and so contradictory to the opinion based on the hymn in the Taittirīya Brāhmaṇa concerning Krittikā being the leader of the Nakshatras, seems to add interest to the question whether there are, or are not, indications in the Rig Veda that the Indian year was counted from the same point on the ecliptic as at present?²

And at once, as it seems to me, on turning to the Rig Veda, on page after page, such indications are to be met with.

The first Nakshatra in the Indian series is named Aswini (Aswins). The two chief stars in that Nakshatra are the twin stars, as they may fairly be

¹ V. p. 94.

² At present the month Chaitra in most parts of India is the first month of the Hindu year. The beginning of the year is measured by the return of the sun to the same point in the Zodiac : at present the beginning of the Lunar Mansion Aswini. (See *Indian Calendar*, p. 45.)

called, α and β Arietis—stars of almost equal radiance. The joyous hymns addressed to the twin heroes, the Aswins, I would claim as new-year hymns composed in honour of these *stars*, whose appearance before sunrise heralded the approach of the great festival-day of the Hindu new year.

The Hindu year is a sidereal year. It is counted at present in most parts of India from a fixed point on the ecliptic, not from a season. It is a calendrical not a cosmic year. Only one apparently small change in the method of counting the years would now require to be made, and again the Aswins might be hymned by the Hindus as the "wondrous," and "not untruthful," *stars*, marking by their heliacal rising a new year's festival—a festival to be held on the 15th, or full moon's day.

The Hindu year is now counted from the new moon immediately *preceding* the sun's arrival at the initial point of the lunar Zodiac. The first of Chaitra (the first of the light half of Chaitra) never falls later than the 12th of April, and may arrive a month earlier. If the year were to be counted from

the same initial point, but from the first new moon *following* instead of that *preceding* the sun's arrival at that point, there would be the 'difference of a whole month in the range of the month Chaitra. The first day of its bright half would then never arrive before the 12th of April, and might fall a month later.

For the interpretation of the Vedic hymns to the Aswins I would make the provisional suggestion, that when these hymns were composed, the year was so counted from the new moon *following* and not from that *preceding* the arrival of the sun at "the end of Revatî and the beginning of Aćvinî." In support of this provisional theory, let us first read the summing up of the Aswini myths, and of the difficulties and uncertainties surrounding them, according to the present modes of explanation ; and then let us consider the astronomic method of interpretation above proposed.

We read that¹ "Next to Indra, Agni, and Soma, the twin deities named the Aśvins are the most prominent in the Rig Veda, judged by the frequency with which they are invoked. They are celebrated

¹ Macdonell, *Vedic Mythology*, p. 49.

in more than fifty entire hymns and in parts of several others, while their name occurs more than 400 times. Though they hold a distinct position among the deities of light and their appellation is Indian, their connexion with any definite phenomenon of light is so obscure, that their original nature has been a puzzle to Vedic interpreters from the earliest times. This obscurity makes it probable that the origin of these gods is to be sought in a pre-Vedic period. The Aśvins are young, the T. S. (Taittirīya Sanhitā) even describing them as the youngest of the gods. They are at the same time ancient. They are bright, lords of lustre, of golden brilliancy, and honey-hued. They possess profound wisdom and occult power. The two most distinctive and frequent epithets of the Aśvins are *dasra*, 'wondrous,' which is almost entirely limited to them, and *nāsatya*, which is generally explained to mean 'not untrue. . . .' Their car moves round heaven. It traverses heaven and earth in a single day as the car of the sun and that of Uṣas (the Dawn) are also said to do. . . . The time of their appearance is often said to be the early dawn, when 'darkness still stands among the ruddy cows' and they yoke their car to descend to earth and receive the offerings of worshippers. Uṣas (the Dawn)

awakes them. They follow after Uṣas in their car. At the yoking of their car Uṣas is born. Thus their relative time seems to have been between dawn and sunrise. But Savitr (the sun) is once said to set their car in motion before the dawn. Occasionally the appearance of the Aśvins, the kindling of the sacrificial fire, the break of dawn, and sunrise seem to be spoken of as simultaneous. The Aśvins are invoked to come to the offering not only at their natural time, but also in the evening or at morning, noon, and sunset. . . . In the A. B. (Aitareya Brahmana) the Aśvins as well as Uṣas and Agni are stated to be gods of dawn; and in the Vedic ritual they are connected with sunrise. . . . The Aśvins may originally have been conceived as finding and restoring or rescuing the vanished light of the sun. In the Rig Veda they have come to be typically succouring divinities." . . . Again, at p. 51, the writer adds, "Quite a number of legends illustrating the succouring power of the Aśvins are referred to in the Rig Veda." Here follows an enumeration of many miraculous "protections," and cures,—and then¹ "The opinion of Bergaigne and others that the various miracles attributed to the Aśvins are anthropomorphized forms of solar phenomena (the

¹ Macdonell, *Vedic Mythology*, p. 53.

healing of the blind man thus meaning the release of the sun from darkness), seems to lack probability. At the same time the legend of Atri may be a reminiscence of a myth explaining the restoration of the vanished sun. As to the physical basis of the Aśvins, the language of the R̥sis is so vague that they themselves do not seem to have understood what phenomenon these deities represented what they actually represented puzzled even the oldest commentators mentioned by Yāska. That scholar remarks that some regarded them (the Aśvins) as Heaven and Earth (as does the S. B.—Satapatha-Brahmana), others as Day and Night, others as sun and moon, while the 'legendary writers' took them to be 'two kings, performers of holy acts.' Yāska's own opinion is obscure."

In contrast to all these vague and often contradictory explanations, the astronomical suggestion made at page 137 may to some appear too matter-of-fact and prosaic. But that a firm and scientific base should underlie mythical and imaginative similes does not in reality detract from their poetic excellence. Indeed, an added fitness, and therefore an added beauty, is to be recognized in the Aswin hymns, when we can think of

them as addressed to well-known and beneficent deities presiding over the new year—deities who manifested themselves in the earliest dawn of the new year's morning under the form of two beautiful and easily to be recognised *stars*, and to whom their worshippers appealed for “protection,” through the unknown dangers of the future year.

I give two diagrams to illustrate the fact that the time of the rising of the stars α and β Arietis must necessarily, on such a new year's festival as above proposed, have taken place in some years before the first intimation of dawn, in others a few minutes before the time of sunrise.

It is of course to be borne in mind that the Vedic years were luni-solar. The actual point therefore on the ecliptic at which the conjunction of sun and moon—or new moon—took place, and from which each year was counted, varied in different years to the extent of nearly 30 degrees. The diagram, Plate XII. Figs. 1 and 2, represents the maximum and minimum distance between the rising of the Yoga stars of the Nakshatra Åswini, and of the sun on the ~~new~~ or full-moon's day of the first month of a luni-solar year; counted from the first

